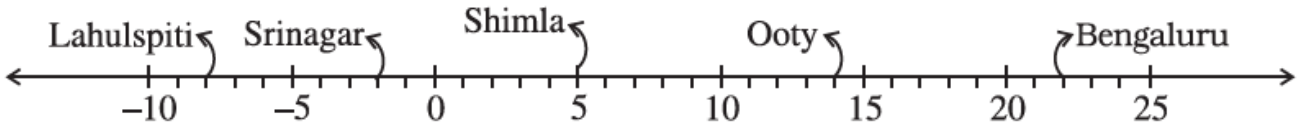
CHAPTER-1 INTEGERS

EXERCISE 1.1

1. Following number line shows the temperature in degree celsius (c^o) at different places on a particular day.



(a) Observe this number line and write the temperature of the places marked on it.
Solution:-
By observing the number line, we can find the temperature of the cities as follows,
Temperature at the Lahulspiti is -8^{o}C
Temperature at the Srinagar is -2^{o}C
Temperature at the Shimla is 5^{o}C
Temperature at the Ooty is 14^{o}C
Temperature at the Bengaluru is 22^{o}C

(b) What is the temperature difference between the hottest and the coldest places among the above?
Solution:-
From the number line we observe that,
The temperature at the hottest place i.e., Bengaluru is 22^{o}C
The temperature at the coldest place i.e., Lahulspiti is -8^{o}C
Temperature difference between hottest and coldest place is = 22^{o}C – (-8^{o}C)
= 22^{o}C + 8^{o}C
= 30^{o}C
Hence, the temperature difference between the hottest and the coldest place is 30^{o}C.

(c) What is the temperature difference between Lahulspiti and Srinagar?
Solution:-
From the given number line,
The temperature at the Lahulspiti is -8^{o}C
The temperature at the Srinagar is -2^{o}C
∴The temperature difference between Lahulspiti and Srinagar is = -2^{o}C – (8^{o}C)
= - 2^{O}C + 8^{o}C
= 6^{o}C

(d) Can we say temperature of Srinagar and Shimla taken together is less than the

temperature at Shimla? Is it also less than the temperature at Srinagar?
Solution:-
From the given number line,
The temperature at Srinagar =-2^{o}C
The temperature at Shimla = 5^{o}C
The temperature of Srinagar and Shimla taken together is = - 2^{o}C + 5^{o}C
= 3^{o}C
∴ 5^{o}C > 3^{o}C
So, the temperature of Srinagar and Shimla taken together is less than the temperature at Shimla.
Then,
3^{o} > -2^{o}
No, the temperature of Srinagar and Shimla taken together is not less than the temperature of Srinagar.

2. In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If Jack's scores in five successive rounds were 25, – 5, – 10, 15 and 10, what was his total at the end?
Solution:-
From the question,
Jack's score in five successive rounds are 25, -5, -10, 15 and 10
The total score of Jack at the end will be = 25 + (-5) + (-10) + 15 + 10
= 25 - 5 - 10 + 15 + 10
= 50 – 15
= 35
∴Jack's total score at the end is 35.

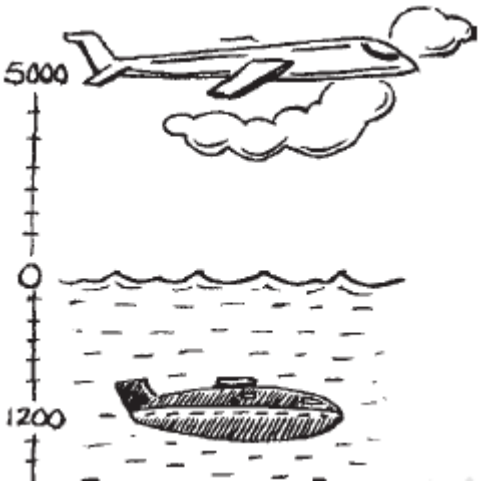
3. At Srinagar temperature was – 5°C on Monday and then it dropped by 2°C on Tuesday. What was the temperature of Srinagar on Tuesday? On Wednesday, it rose by 4°C. What was the temperature on this day?
Solution:-
From the question,
Temperature on Monday at Srinagar = -5^{o}C
Temperature on Tuesday at Srinagar is dropped by 2^{o}C = Temperature on Monday – 2^{o}C
= -5^{o}C – 2^{o}C
= -7^{o}C
Temperature on Wednesday at Srinagar is rose by 4^{o}C = Temperature on Tuesday + 4^{o}C

$= -7^oC + 4^oC$

$= -3^oC$

Thus, the temperature on Tuesday and Wednesday was -7^oC and -3^oC respectively.

4. A plane is flying at the height of 5000 m above the sea level. At a particular point, it is exactly above a submarine floating 1200 m below the sea level. What is the vertical distance between them?



Solution:-

From the question,

Plane is flying at the height = 5000 m

Depth of Submarine = -1200 m

The vertical distance between plane and submarine = 5000 m – (- 1200) m

= 5000 m + 1200 m

= 6200 m

5. Mohan deposits ₹ 2,000 in his bank account and withdraws ₹ 1,642 from it, the next day. If withdrawal of amount from the account is represented by a negative integer, then how will you represent the amount deposited? Find the balance in Mohan's account after the withdrawal.

Solution:-

Withdrawal of amount from the account is represented by a negative integer.

Then, deposit of amount to the account is represented by a positive integer.

From the question,

Total amount deposited in bank account by the Mohan = ₹ 2000

Total amount withdrawn from the bank account by the Mohan = - ₹ 1642

Balance in Mohan's account after the withdrawal = amount deposited + amount withdrawn

= ₹ 2000 + (-₹ 1642)
= ₹ 2000 - ₹ 1642
= ₹ 358

Hence, the balance in Mohan's account after the withdrawal is ₹ 358

6. Rita goes 20 km towards east from a point A to the point B. From B, she moves 30 km towards west along the same road. If the distance towards east is represented by a positive integer then, how will you represent the distance travelled towards west? By which integer will you represent her final position from A?

Solution:-

From the question, it is given that

A positive integer represents the distance towards the east.

Then, distance travelled towards the west will be represented by a negative integer.

Rita travels a distance in east direction = 20 km

Rita travels a distance in west direction = - 30 km

∴Distance travelled from A = 20 + (- 30)

= 20 – 30
= -10 km

Hence, we will represent the distance travelled by Rita from point A by a negative integer, i.e. – 10 km

7. In a magic square each row, column and diagonal have the same sum. Check which of the following is a magic square.

5	–1	– 4
–5	–2	7
0	3	–3

(i)

1	–10	0
– 4	–3	–2
– 6	4	–7

(ii)

Solution:-

First we consider the square (i)

By adding the numbers in each rows we get,

$= 5 + (- 1) + (- 4) = 5 – 1 – 4 = 5 – 5 = 0$

$= -5 + (-2) + 7 = - 5 – 2 + 7 = -7 + 7 = 0$

$= 0 + 3 + (-3) = 3 – 3 = 0$

By adding the numbers in each columns we get,

$= 5 + (- 5) + 0 = 5 – 5 = 0$

$= (-1) + (-2) + 3 = -1 – 2 + 3 = -3 + 3 = 0$

$= -4 + 7 + (-3) = -4 + 7 – 3 = -7 + 7 = 0$

By adding the numbers in diagonals we get,

$= 5 + (-2) + (-3) = 5 – 2 – 3 = 5 – 5 = 0$

$= -4 + (-2) + 0 = - 4 – 2 = -6$

Because sum of one diagonal is not equal to zero,

So, (i) is not a magic square

Now, we consider the square (ii)

By adding the numbers in each rows we get,

$= 1 + (-10) + 0 = 1 – 10 + 0 = -9$

$= (-4) + (-3) + (-2) = -4 - 3 – 2 = -9$

$= (-6) + 4 + (-7) = -6 + 4 – 7 = -13 + 4 = -9$

By adding the numbers in each columns we get,

$= 1 + (-4) + (-6) = 1 – 4 – 6 = 1 – 10 = -9$

$= (-10) + (-3) + 4 = -10 – 3 + 4 = -13 + 4$

$= 0 + (-2) + (-7) = 0 – 2 – 7 = -9$

By adding the numbers in diagonals we get,

$= 1 + (-3) + (-7) = 1 – 3 – 7 = 1 – 10 = -9$

$= 0 + (-3) + (-6) = 0 – 3 – 6 = -9$

This (ii) square is a magic square, because sum of each row, each column and diagonal is equal to -9.

8. Verify a – (– b) = a + b for the following values of a and b.

(i) a = 21, b = 18

Solution:-

From the question,

a = 21 and b = 18

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

$= 21 – (- 18)$

$= 21 + 18$

= 39

Now, Right Hand Side (RHS) = a + b

= 21 + 18

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

(ii) a = 118, b = 125

Solution:-

From the question,

a = 118 and b = 125

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 118 – (- 125)

= 118 + 125

= 243

Now, Right Hand Side (RHS) = a + b

= 118 + 125

= 243

By comparing LHS and RHS

LHS = RHS

243 = 243

Hence, the value of a and b is verified.

(iii) a = 75, b = 84

Solution:-

From the question,

a = 75 and b = 84

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 75 – (- 84)

= 75 + 84

= 159

Now, Right Hand Side (RHS) = a + b

= 75 + 84

= 159

By comparing LHS and RHS

LHS = RHS

159 = 159

Hence, the value of a and b is verified.

(iv) a = 28, b = 11

Solution:-

From the question,

a = 28 and b = 11

To verify a – (- b) = a + b

Let us take Left Hand Side (LHS) = a – (- b)

= 28 – (- 11)

= 28 + 11

= 39

Now, Right Hand Side (RHS) = a + b

= 28 + 11

= 39

By comparing LHS and RHS

LHS = RHS

39 = 39

Hence, the value of a and b is verified.

9. Use the sign of >, < or = in the box to make the statements true.

(a) (-8) + (-4) [ ] (-8) – (-4)

Solution:-

Let us take Left Hand Side (LHS) = (-8) + (-4)

= -8 – 4

= -12

Now, Right Hand Side (RHS) = (-8) - (-4)

= -8 + 4

= -4

By comparing LHS and RHS

LHS < RHS

-12 < -4

∴ (-8) + (-4) [<] (-8) – (-4)

(b) (-3) + 7 – (19) [ ] 15 – 8 + (-9)

Solution:-

Let us take Left Hand Side (LHS) = (-3) + 7 - 19

= -3 + 7 - 19

= -22 + 7

= -15

Now, Right Hand Side (RHS) = 15 – 8 + (-9)

= 15 – 8 - 9

= 15 – 17

= -2

By comparing LHS and RHS

LHS < RHS

-15 < -2

∴ (-3) + 7 – (19) [<] 15 – 8 + (-9)

(c) 23 – 41 + 11 [ ] 23 – 41 – 11

Solution:-

Let us take Left Hand Side (LHS) = 23 – 41 + 11

= 34 - 41

= - 7

Now, Right Hand Side (RHS) = 23 – 41 - 11

= 23 - 52

= - 29

By comparing LHS and RHS

LHS > RHS

- 7 > -29

∴ 23 – 41 + 11 [>] 23 – 41 – 11

(d) 39 + (-24) – (15) [ ] 36 + (-52) – (- 36)

Solution:-

Let us take Left Hand Side (LHS) = 39 + (-24) - 15

= 39 – 24 - 15

= 39 – 39

= 0

Now, Right Hand Side (RHS) = 36 + (-52) – (- 36)

= 36 – 52 + 36

= 72 – 52

= 20

By comparing LHS and RHS

LHS < RHS

0 < 20

∴ 39 + (-24) – (15) [<] 36 + (-52) – (- 36)

(e) – 231 + 79 + 51 [ ] -399 + 159 + 81

Solution:-

Let us take Left Hand Side (LHS) = - 231 + 79 + 51

= - 231 + 130

= -101

Now, Right Hand Side (RHS) = - 399 + 159 + 81

= - 399 + 240

= - 159

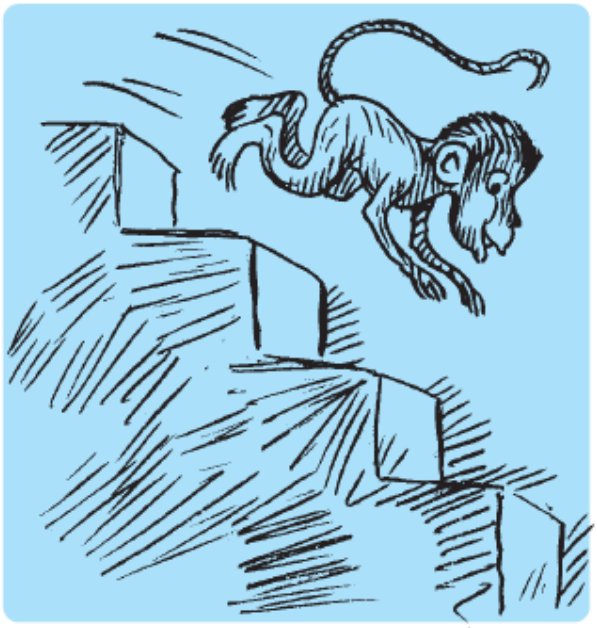
By comparing LHS and RHS

LHS > RHS

-101 > -159

∴ – 231 + 79 + 51 [>] -399 + 159 + 81

10. A water tank has steps inside it. A monkey is sitting on the topmost step (i.e., the first step). The water level is at the ninth step.



(i) He jumps 3 steps down and then jumps back 2 steps up. In how many jumps will he reach the water level?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the top most step i.e., first step

In 1^{st} jump monkey will be at step = 1 + 3 = 4 steps

In 2^{nd} jump monkey will be at step = 4 + (-2) = 4 – 2 = 2 steps

In 3^{rd} jump monkey will be at step = 2 + 3 = 5 steps

In 4^{th} jump monkey will be at step = 5 + (-2) = 5 – 2 = 3 steps

In 5^{th} jump monkey will be at step = 3 + 3 = 6 steps

In 6^{th} jump monkey will be at step = 6 + (-2) = 6 – 2 = 4 steps

In 7^{th} jump monkey will be at step = 4 + 3 = 7 steps

In 8^{th} jump monkey will be at step = 7 + (-2) = 7 – 2 = 5 steps

In 9^{th} jump monkey will be at step = 5 + 3 = 8 steps

In 10^{th} jump monkey will be at step = 8 + (-2) = 8 – 2 = 6 steps

In 11^{th} jump monkey will be at step = 6 + 3 = 9 steps

∴Monkey took 11 jumps (i.e., 9^{th} step) to reach the water level

(ii) After drinking water, he wants to go back. For this, he jumps 4 steps up and then jumps back 2 steps down in every move. In how many jumps will he reach back the top step?

Solution:-

Let us consider steps moved down are represented by positive integers and then, steps moved up are represented by negative integers.

Initially monkey is sitting on the ninth step i.e., at the water level

In 1^{st} jump monkey will be at step = 9 + (-4) = 9 – 4 = 5 steps

In 2^{nd} jump monkey will be at step = 5 + 2 = 7 steps

In 3^{rd} jump monkey will be at step = 7 + (-4) = 7 – 4 = 3 steps

In 4^{th} jump monkey will be at step = 3 + 2 = 5 steps

In 5^{th} jump monkey will be at step = 5 + (-4) = 5 – 4 = 1 step

∴Monkey took 5 jumps to reach back the top step i.e., first step.

(iii) If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers, represent his moves in part (i) and (ii) by completing the following; (a) – 3 + 2 – ... = – 8 (b) 4 – 2 + ... = 8. In (a) the sum (– 8) represents going down by eight steps. So, what will the sum 8 in (b) represent?

Solution:-

From the question, it is given that

If the number of steps moved down is represented by negative integers and the number of steps moved up by positive integers.

Monkey moves in part (i)

= - 3 + 2 – ……. = - 8

Then LHS = - 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3 + 2 – 3

= - 18 + 10

= - 8

RHS = -8

∴Moves in part (i) represents monkey is going down 8 steps. Because negative integer.

Now,

Monkey moves in part (ii)

= 4 – 2 + ……. = 8

Then LHS = 4 – 2 + 4 – 2 + 4

= 12 - 4

= 8

RHS = 8

∴Moves in part (ii) represents monkey is going up 8 steps. Because positive integer.

EXERCISE 1.2

1. Write down a pair of integers whose:
(a) sum is -7
Solution:-

= - 4 + (-3)
= - 4 – 3 … [∵ (+ × - = -)]
= - 7

(b) difference is – 10
Solution:-

= -25 - (-15)
= - 25 + 15 … [∵ (- × - = +)]
= -10

(c) sum is 0
Solution:-

= 4 + (-4)
= 4 – 4
= 0

2. (a) Write a pair of negative integers whose difference gives 8
Solution:-

= (-5) – (- 13)
= -5 + 13 … [∵ (- × - = +)]
= 8

(b) Write a negative integer and a positive integer whose sum is – 5.
Solution:-

= -25 + 20
= -5

(c) Write a negative integer and a positive integer whose difference is – 3.
Solution:-

= - 6 – (-3)
= - 6 + 3 … [∵ (- × - = +)]
= - 3

3. In a quiz, team A scored – 40, 10, 0 and team B scored 10, 0, – 40 in three successive rounds. Which team scored more? Can we say that we can add integers in any order?
Solution:-
From the question, it is given that
Score of team A = -40, 10, 0
Total score obtained by team A = - 40 + 10 + 0
= - 30
Score of team B = 10, 0, -40
Total score obtained by team B = 10 + 0 + (-40)
= 10 + 0 – 40
= - 30
Thus, the score of the both A team and B team is same.
Yes, we can say that we can add integers in any order.

4. Fill in the blanks to make the following statements true:
(i) (–5) + (– 8) = (– 8) + (.....)
Solution:-
Let us assume the missing integer be x,
Then,
= (–5) + (– 8) = (– 8) + (x)
= - 5 – 8 = - 8 + x
= - 13 = - 8 + x
By sending – 8 from RHS to LHS it becomes 8,
= - 13 + 8 = x
= x = - 5
Now substitute the x value in the blank place,
–5) + (– 8) = (– 8) + (- 5) … [This equation is in the form of Commutative law of Addition]

(ii) –53 + ... = –53
Solution:-
Let us assume the missing integer be x,
Then,
= –53 + x = –53
By sending – 53 from LHS to RHS it becomes 53,
= x = -53 + 53
= x = 0

Now substitute the x value in the blank place,

= –53 + 0 = –53 … [This equation is in the form of Closure property of Addition]

(iii) 17 + ... = 0

Solution:-

Let us assume the missing integer be x,

Then,

= 17 + x = 0

By sending 17 from LHS to RHS it becomes -17,

= x = 0 - 17

= x = - 17

Now substitute the x value in the blank place,

= 17 + (-17) = 0 … [This equation is in the form of Closure property of Addition]

= 17 – 17 = 0

(iv) [13 + (– 12)] + (.....) = 13 + [(–12) + (–7)]

Solution:-

Let us assume the missing integer be x,

Then,

= [13 + (– 12)] + (x) = 13 + [(–12) + (–7)]

= [13 – 12] + (x) = 13 + [–12 –7]

= [1] + (x) = 13 + [-19]

= 1 + (x) = 13 – 19

= 1 + (x) = -6

By sending 1 from LHS to RHS it becomes -1,

= x = -6 – 1

= x = -7

Now substitute the x value in the blank place,

= [13 + (– 12)] + (-7) = 13 + [(–12) + (–7)] … [This equation is in the form of Associative property of Addition]

(v) (– 4) + [15 + (–3)] = [– 4 + 15] +.....

Solution:-

Let us assume the missing integer be x,

Then,

= (– 4) + [15 + (–3)] = [– 4 + 15] + x

= (– 4) + [15 – 3)] = [– 4 + 15] + x

= (-4) + [12] = [11] + x

= 8 = 11 + x

By sending 11 from RHS to LHS it becomes -11,

= 8 – 11 = x

= x = -3

Now substitute the x value in the blank place,

= (– 4) + [15 + (–3)] = [– 4 + 15] + -3 … [This equation is in the form of Associative property of Addition]

EXERCISE 1.3

1. Find each of the following products:

(a) 3 × (–1)

Solution:-

By the rule of Multiplication of integers,

= 3 × (-1)

= -3 … [∵ (+ × - = -)]

(b) (–1) × 225

Solution:-

By the rule of Multiplication of integers,

= (-1) × 225

= -225 … [∵ (- × + = -)]

(c) (–21) × (–30)

Solution:-

By the rule of Multiplication of integers,

= (-21) × (-30)

= 630 … [∵ (- × - = +)]

(d) (–316) × (–1)

Solution:-

By the rule of Multiplication of integers,

= (-316) × (-1)

= 316 … [∵ (- × - = +)]

(e) (–15) × 0 × (–18)

Solution:-

By the rule of Multiplication of integers,

= (–15) × 0 × (–18)

= 0

∵Any integer is multiplied with zero and the answer is zero itself.

(f) (–12) × (–11) × (10)

Solution:-

By the rule of Multiplication of integers,

= (–12) × (-11) × (10)

First multiply the two numbers having same sign,

= 132 × 10 … [∵ (- × - = +)]

= 1320

(g) 9 × (–3) × (– 6)

Solution:-

By the rule of Multiplication of integers,

= 9 × (-3) × (-6)

First multiply the two numbers having same sign,

= 9 × 18 … [∵ (- × - = +)]

= 162

(h) (–18) × (–5) × (– 4)

Solution:-

By the rule of Multiplication of integers,

= (-18) × (-5) × (-4)

First multiply the two numbers having same sign,

= 90 × -4 … [∵ (- × - = +)]

= - 360 … [∵ (+ × - = -)]

(i) (–1) × (–2) × (–3) × 4

Solution:-

By the rule of Multiplication of integers,

= [(–1) × (–2)] × [(–3) × 4]

= 2 × (-12) … [∵ (- × - = +), (- × + = -)]

= - 24

(j) (–3) × (–6) × (–2) × (–1)

Solution:-

By the rule of Multiplication of integers,

= [(–3) × (–6)] × [(–2) × (–1)]

First multiply the two numbers having same sign,

= 18 × 2 … [∵ (- × - = +)

= 36

2. Verify the following:

(a) 18 × [7 + (–3)] = [18 × 7] + [18 × (–3)]

Solution:-

From the given equation,

Let us consider the Left Hand Side (LHS) first = 18 × [7 + (–3)]

= 18 × [7 – 3]

= 18 × 4

= 72

Now, consider the Right Hand Side (RHS) = [18 × 7] + [18 × (–3)]

= [126] + [-54]

= 126 – 54

= 72

By comparing LHS and RHS,

72 = 72

LHS = RHS

Hence, the given equation is verified.

(b) (–21) × [(– 4) + (– 6)] = [(–21) × (– 4)] + [(–21) × (– 6)]

Solution:-

From the given equation,

Let us consider the Left Hand Side (LHS) first = (–21) × [(– 4) + (– 6)]

= (-21) × [-4 – 6]

= (-21) × [-10]

= 210

Now, consider the Right Hand Side (RHS) = [(–21) × (– 4)] + [(–21) × (– 6)]

= [84] + [126]

= 210

By comparing LHS and RHS,

210 = 210

LHS = RHS

Hence, the given equation is verified.

3. (i) For any integer a, what is (–1) × a equal to?

Solution:-

= (-1) × a = -a

Because, when we multiplied any integer a with -1, then we get additive inverse of that integer.

(ii). Determine the integer whose product with (–1) is

(a) –22

Solution:-

Now, multiply -22 with (-1), we get

$= -22 \times (-1)$

$= 22$

Because, when we multiplied integer -22 with -1, then we get additive inverse of that integer.

(b) 37

Solution:-

Now, multiply 37 with (-1), we get

$= 37 \times (-1)$

$= -37$

Because, when we multiplied integer 37 with -1, then we get additive inverse of that integer.

(c) 0

Solution:-

Now, multiply 0 with (-1), we get

$= 0 \times (-1)$

$= 0$

Because, the product of negative integers and zero give zero only.

4. Starting from (–1) × 5, write various products showing some pattern to show (–1) × (–1) = 1.

Solution:-

The various products are,

$= -1 \times 5 = -5$

$= -1 \times 4 = -4$

$= -1 \times 3 = -3$

$= -1 \times 2 = -2$

$= -1 \times 1 = -1$

$= -1 \times 0 = 0$

$= -1 \times -1 = 1$

We concluded that the product of one negative integer and one positive integer is negative integer. Then, the product of two negative integers is a positive integer.

5. Find the product, using suitable properties:

(a) 26 × (– 48) + (– 48) × (–36)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)

Let, a = -48, b = 26, c = -36

Now,

= 26 × (– 48) + (– 48) × (–36)

= -48 × (26 + (-36)

= -48 × (26 – 36)

= -48 × (-10)

= 480 … [∵ (- × - = +)

(b) 8 × 53 × (–125)

Solution:-

The given equation is in the form of Commutative law of Multiplication.

= a × b = b × a

Then,

= 8 × [53 × (-125)]

= 8 × [(-125) × 53]

= [8 × (-125)] × 53

= [-1000] × 53

= - 53000

(c) 15 × (–25) × (– 4) × (–10)

Solution:-

The given equation is in the form of Commutative law of Multiplication.

= a × b = b × a

Then,

= 15 × [(–25) × (– 4)] × (–10)

= 15 × [100] × (–10)

= 15 × [-1000]

= - 15000

(d) (– 41) × 102

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)
= (-41) × (100 + 2)
= (-41) × 100 + (-41) × 2
= - 4100 – 82
= - 4182

(e) 625 × (–35) + (– 625) × 65

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)
= 625 × [(-35) + (-65)]
= 625 × [-100]
= - 62500

(f) 7 × (50 – 2)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Subtraction.

= a × (b - c) = (a × b) - (a × c)
= (7 × 50) – (7 × 2)
= 350 – 14
= 336

(g) (–17) × (–29)

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)
= (-17) × [-30 + 1]
= [(-17) × (-30)] + [(-17) × 1]
= [510] + [-17]
= 493

(h) (–57) × (–19) + 57

Solution:-

The given equation is in the form of Distributive law of Multiplication over Addition.

= a × (b + c) = (a × b) + (a × c)
= (57 × 19) + (57 × 1)
= 57 [19 + 1]

= 57 × 20
= 1140

6. A certain freezing process requires that room temperature be lowered from 40°C at the rate of 5°C every hour. What will be the room temperature 10 hours after the process begins?

Solution:-

From the question, it is given that
Let us take the lowered temperature as negative,
Initial temperature = 40^oC
Change in temperature per hour = -5^oC
Change in temperature after 10 hours = (-5) × 10 = -50^oC
∴The final room temperature after 10 hours of freezing process = $40^oC + (-50^oC)$
= -10^oC

7. In a class test containing 10 questions, 5 marks are awarded for every correct answer and (–2) marks are awarded for every incorrect answer and 0 for questions not attempted.

(i) Mohan gets four correct and six incorrect answers. What is his score?

Solution:-

From the question,
Marks awarded for 1 correct answer = 5
Then,
Total marks awarded for 4 correct answer = 4 × 5 = 20
Marks awarded for 1 wrong answer = -2
Then,
Total marks awarded for 6 wrong answer = 6 × -2 = -12
∴Total score obtained by Mohan = 20 + (-12)
= 20 – 12
= 8

(ii) Reshma gets five correct answers and five incorrect answers, what is her score?

Solution:-

From the question,
Marks awarded for 1 correct answer = 5
Then,
Total marks awarded for 5 correct answer = 5 × 5 = 25

Marks awarded for 1 wrong answer = -2
Then,
Total marks awarded for 5 wrong answer = 5 × -2 = -10
∴Total score obtained by Reshma = 25 + (-10)
= 25 – 10
= 15

(iii) Heena gets two correct and five incorrect answers out of seven questions she attempts. What is her score?
Solution:-
From the question,
Marks awarded for 1 correct answer = 5
Then,
Total marks awarded for 2 correct answer = 2 × 5 = 10
Marks awarded for 1 wrong answer = -2
Then,
Total marks awarded for 5 wrong answer = 5 × -2 = -10
Marks awarded for questions not attempted is = 0
∴Total score obtained by Heena = 10 + (-10)
= 10 – 10
= 0

8. A cement company earns a profit of ₹ 8 per bag of white cement sold and a loss of ₹ 5 per bag of grey cement sold.
(a) The company sells 3,000 bags of white cement and 5,000 bags of grey cement in a month. What is its profit or loss?
Solution:-
We denote profit in positive integer and loss in negative integer,
From the question,
Cement company earns a profit on selling 1 bag of white cement = ₹ 8 per bag
Then,
Cement company earns a profit on selling 3000 bags of white cement = 3000 × ₹ 8
= ₹ 24000
Loss on selling 1 bag of grey cement = - ₹ 5 per bag
Then,
Loss on selling 5000 bags of grey cement = 5000 × - ₹ 5
= - ₹ 25000

Total loss or profit earned by the cement company = profit + loss

= 24000 + (-25000)

= - ₹1000

Thus, a loss of ₹ 1000 will be incurred by the company.

(b) What is the number of white cement bags it must sell to have neither profit nor loss, if the number of grey bags sold is 6,400 bags.

Solution:-

We denote profit in positive integer and loss in negative integer,

From the question,

Cement company earns a profit on selling 1 bag of white cement = ₹ 8 per bag

Let the number of white cement bags be x.

Then,

Cement company earns a profit on selling x bags of white cement = (x) × ₹ 8

= ₹ 8x

Loss on selling 1 bag of grey cement = - ₹ 5 per bag

Then,

Loss on selling 6400 bags of grey cement = 6400 × - ₹ 5

= - ₹ 32000

According to the question,

Company must sell to have neither profit nor loss.

= Profit + loss = 0

= 8x + (-32000) =0

By sending -32000 from LHS to RHS it becomes 32000

= 8x = 32000

= x = 32000/8

= x = 4000

Hence, the 4000 bags of white cement have neither profit nor loss.

9. Replace the blank with an integer to make it a true statement.

(a) (–3) × _____ = 27

Solution:-

Let us assume the missing integer be x,

Then,

= (–3) × (x) = 27

= x = - (27/3)

= x = -9

Let us substitute the value of x in the place of blank,

= (–3) × (-9) = 27 … [∵ (- × - = +)]

(b) 5 × _____ = –35

Solution:-

Let us assume the missing integer be x,

Then,

= (5) × (x) = -35

= x = - (-35/5)

= x = -7

Let us substitute the value of x in the place of blank,

= (5) × (-7) = -35 … [∵ (+ × - = -)]

(c) _____ × (– 8) = –56

Solution:-

Let us assume the missing integer be x,

Then,

= (x) × (-8) = -56

= x = (-56/-8)

= x = 7

Let us substitute the value of x in the place of blank,

= (7) × (-8) = -56 … [∵ (+ × - = -)]

(d) _____ × (–12) = 132

Solution:-

Let us assume the missing integer be x,

Then,

= (x) × (-12) = 132

= x = - (132/12)

= x = - 11

Let us substitute the value of x in the place of blank,

= (–11) × (-12) = 132 … [∵ (- × - = +)]

EXERCISE 1.4

1. Evaluate each of the following:

(a) (–30) ÷ 10

Solution:-

= (–30) ÷ 10

= - 3

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(b) 50 ÷ (–5)

Solution:-

= (50) ÷ (-5)

= - 10

When we divide a positive integer by a negative integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(c) (–36) ÷ (–9)

Solution:-

= (-36) ÷ (-9)

= 4

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

(d) (– 49) ÷ (49)

Solution:-

= (–49) ÷ 49

= - 1

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(e) 13 ÷ [(–2) + 1]

Solution:-

= 13 ÷ [(–2) + 1]

= 13 ÷ (-1)

= - 13

When we divide a positive integer by a negative integer, we first divide them as whole

numbers and then put minus sign (-) before the quotient.

(f) 0 ÷ (–12)

Solution:-

= 0 ÷ (-12)

= 0

When we divide zero by a negative integer gives zero.

(g) (–31) ÷ [(–30) + (–1)]

Solution:-

= (–31) ÷ [(–30) + (–1)]

= (-31) ÷ [-30 – 1]

= (-31) ÷ (-31)

= 1

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

(h) [(–36) ÷ 12] ÷ 3

Solution:-

First we have to solve the integers with in the bracket,

= [(–36) ÷ 12]

= (–36) ÷ 12

= - 3

Then,

= (-3) ÷ 3

= -1

When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.

(i) [(– 6) + 5)] ÷ [(–2) + 1]

Solution:-

The given question can be written as,

= [-1] ÷ [-1]

= 1

When we divide a negative integer by a negative integer, we first divide them as whole numbers and then put positive sign (+) before the quotient.

2. Verify that a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c) for each of the following values of a, b and c.
(a) a = 12, b = – 4, c = 2
Solution:-
From the question, a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c)
Given, a = 12, b = – 4, c = 2
Now, consider LHS = a ÷ (b + c)
= 12 ÷ (-4 + 2)
= 12 ÷ (-2)
= -6
When we divide a positive integer by a negative integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.
Then, consider RHS = (a ÷ b) + (a ÷ c)
= (12 ÷ (-4)) + (12 ÷ 2)
= (-3) + (6)
= 3
By comparing LHS and RHS
= -6 ≠ 3
= LHS ≠ RHS
Hence, the given values are verified.

(b) a = (–10), b = 1, c = 1
Solution:-
From the question, a ÷ (b + c) ≠ (a ÷ b) + (a ÷ c)
Given, a = (-10), b = 1, c = 1
Now, consider LHS = a ÷ (b + c)
= (-10) ÷ (1 + 1)
= (-10) ÷ (2)
= -5
When we divide a negative integer by a positive integer, we first divide them as whole numbers and then put minus sign (-) before the quotient.
Then, consider RHS = (a ÷ b) + (a ÷ c)
= ((-10) ÷ (1)) + ((-10) ÷ 1)
= (-10) + (-10)
= -10 – 10
= -20
By comparing LHS and RHS

= -5 ≠ -20

= LHS ≠ RHS

Hence, the given values are verified.

3. Fill in the blanks:

(a) 369 ÷ _____ = 369

Solution:-

Let us assume the missing integer be x,

Then,

= 369 ÷ x = 369

= x = (369/369)

= x = 1

Now, put the valve of x in the blank.

= 369 ÷ 1 = 369

(b) (–75) ÷ _____ = –1

Solution:-

Let us assume the missing integer be x,

Then,

= (-75) ÷ x = -1

= x = (-75/-1)

= x = 75

Now, put the valve of x in the blank.

= (-75) ÷ 75 = -1

(c) (–206) ÷ _____ = 1

Solution:-

Let us assume the missing integer be x,

Then,

= (-206) ÷ x = 1

= x = (-206/1)

= x = -206

Now, put the valve of x in the blank.

= (-206) ÷ (-206) = 1

(d) – 87 ÷ _____ = 87

Solution:-

Let us assume the missing integer be x,
Then,

= (-87) ÷ x = 87

= x = (-87)/87

= x = -1

Now, put the valve of x in the blank.

= (-87) ÷ (-1) = 87

(e) _____ ÷ 1 = – 87

Solution:-

Let us assume the missing integer be x,
Then,

= (x) ÷ 1 = -87

= x = (-87) × 1

= x = -87

Now, put the valve of x in the blank.

= (-87) ÷ 1 = -87

(f) _____ ÷ 48 = –1

Solution:-

Let us assume the missing integer be x,
Then,

= (x) ÷ 48 = -1

= x = (-1) × 48

= x = -48

Now, put the valve of x in the blank.

= (-48) ÷ 48 = -1

(g) 20 ÷ _____ = –2

Solution:-

Let us assume the missing integer be x,
Then,

= 20 ÷ x = -2

= x = (20)/ (-2)

= x = -10

Now, put the valve of x in the blank.

= (20) ÷ (-10) = -2

(h) _____ ÷ (4) = –3

Solution:-

Let us assume the missing integer be x,

Then,

= (x) ÷ 4 = -3

= x = (-3) × 4

= x = -12

Now, put the valve of x in the blank.

= (-12) ÷ 4 = -3

4. Write five pairs of integers (a, b) such that a ÷ b = –3. One such pair is (6, –2) because 6 ÷ (–2) = (–3).

Solution:-

(i) (15, -5)

Because, 15 ÷ (–5) = (–3)

(ii) (-15, 5)

Because, (-15) ÷ (5) = (–3)

(iii) (18, -6)

Because, 18 ÷ (–6) = (–3)

(iv) (-18, 6)

Because, (-18) ÷ 6 = (–3)

(v) (21, -7)

Because, 21 ÷ (–7) = (–3)

5. The temperature at 12 noon was 10°C above zero. If it decreases at the rate of 2°C per hour until midnight, at what time would the temperature be 8°C below zero? What would be the temperature at mid-night?

Solution:-

From the question is given that,

Temperature at the beginning i.e., at 12 noon = 10^oC

Rate of change of temperature = - 2^oC per hour

Then,

Temperature at 1 PM = 10 + (-2) = 10 – 2 = 8^oC

Temperature at 2 PM = 8 + (-2) = 8 – 2 = 6^oC

Temperature at 3 PM = 6 + (-2) = 6 – 2 = 4^oC

Temperature at 4 PM = 4 + (-2) = 4 – 2 = 2^oC

Temperature at 5 PM = 2 + (-2) = 2 – 2 = 0^oC
Temperature at 6 PM = 0 + (-2) = 0 – 2 = -2^oC
Temperature at 7 PM = -2 + (-2) = -2 -2 = -4^oC
Temperature at 8 PM = -4 + (-2) = -4 – 2 = -6^oC
Temperature at 9 PM = -6 + (-2) = -6 – 2 = -8^oC
∴At 9 PM the temperature will be 8^oC below zero
Then,
The temperature at mid-night i.e., at 12 AM
Change in temperature in 12 hours = $-2^oC \times 12 = -24^oC$
So, at midnight temperature will be = 10 + (-24)
$= -14^oC$
So, at midnight temperature will be 14^oC below 0.

6. In a class test (+ 3) marks are given for every correct answer and (–2) marks are given for every incorrect answer and no marks for not attempting any question. (i) Radhika scored 20 marks. If she has got 12 correct answers, how many questions has she attempted incorrectly? (ii) Mohini scores –5 marks in this test, though she has got 7 correct answers. How many questions has she attempted incorrectly?
Solution:-
From the question,
Marks awarded for 1 correct answer = + 3
Marks awarded for 1 wrong answer = -2
(i) Radhika scored 20 marks
Then,
Total marks awarded for 12 correct answers = 12 × 3 = 36
Marks awarded for incorrect answers = Total score – Total marks awarded for 12 correct Answers
= 20 – 36
= - 16
So, the number of incorrect answers made by Radhika = (-16) ÷ (-2)
= 8
(ii) Mohini scored -5 marks
Then,
Total marks awarded for 7 correct answers = 7 × 3 = 21
Marks awarded for incorrect answers = Total score – Total marks awarded for 12 correct Answers
= - 5 – 21

= - 26

So, the number of incorrect answers made by Radhika = (-26) ÷ (-2)

= 13

7. An elevator descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach – 350 m.

Solution:-

From the question,

The initial height of the elevator = 10 m

Final depth of elevator = - 350 m … [∵distance descended is denoted by a negative integer]

The total distance to descended by the elevator = (-350) – (10)

= - 360 m

Then,

Time taken by the elevator to descend -6 m = 1 min

So, time taken by the elevator to descend – 360 m = (-360) ÷ (-60)

= 60 minutes

= 1 hour

DELHI PUBLIC SCHOOL, GANDHINAGAR

CHAPTER – 1 INTEGERS

MIND MAP

This chapter consists of three different topics. The most probable questions from the examination point of view are given below.

TYPE: 1 SOLVE THE FOLLOWING

1. What is the value of $(-22) - [(-23) - (-17) - (-61)]$?

2. Evaluate: (-100)− 5 (b) (-36)× (-4) (c) $\frac{3}{4}$ + (-12) (d) [(-30)÷5]÷2

TYPE: 2 VERIFICATION OF THE PROPERTIES

1. Verify the following:

a. (-22) × [(-4) + (-5)]=[(-22) × (-4)] + [(-22) × (-5)]

b. (-12) × [(3) + (-9)]=[(-12) × (4)] + [(-12) × (-9)]

TYPE: 3 WORD PROBLEMS

1. In a test (+5) marks are given for every correct answer and (-2) marks are given for every incorrect answer. Radhika answered all the questions and scored 30 marks and got 10 correct answers. How many incorrect answers had she attempted?

2. The price of the stock decreases ₹ 45 per day for four consecutive days. What was the total change in value of the stock over 4 day period?

3. Write down the pair of integers whose

a. Sum is -4

b. Sum is 0

c. Difference is 2

d. Difference is -6

DELHI PUBLIC SCHOOL, GANDHINAGAR

CH.2 FRACTIONS AND DECIMALS

MIND MAP

This chapter consists of three different topics. The most probable questions from the examination point of view are given below.

TYPE: 1 OPERATIONS ON FRACTIONS:

1. $\left(1\frac{2}{9}+\frac{2}{9}\right)$
2. $\left(1\times 3\frac{1}{5}\right)$
3. $\left(\frac{1}{6}\div 2\frac{2}{5}\right)$

TYPE: 2 OPERATIONS ON DECIMALS:

1. 0.2×0.38
2. 0.232×1000
3. $0.267 \div 0.35$

TYPE: 3 WORD PROBLEMS:

1. Savita is dividing $7\frac{1}{6}$ kg of sweets equally among her seven friends. How much does each friend receive?

2. Ramu finishes $\frac{1}{3}$ part of a work in 1 hour. How much $2\frac{1}{5}$ part of the work will be finished in hours?

3. Three boys earned a total of ₹ 235.50. What was the average amount earned per boy?

4. Harmeet purchased 3.5kg of potatoes at the rate of ₹ 13.75per kg. How much money should she pay in nearest rupees?

Ch.2 FRACTIONS AND DECIMALS

Exercise 2.1

1. Solve:

(i) 2 – (3/5)

Solution:-

For subtraction of two unlike fractions, first change them to the like fractions.

LCM of 1, 5 = 5

Now, let us change each of the given fraction into an equivalent fraction having 5 as the denominator.

= [(2/1) × (5/5)] = (10/5)

= [(3/5) × (1/1)] = (3/5)

Now,

= (10/5) - (3/5)

= [(10 – 3)/5]

= (7/5)

(ii) 4 + (7/8)

Solution:-

For addition of two unlike fractions, first change them to the like fractions.

LCM of 1, 8 = 8

Now, let us change each of the given fraction into an equivalent fraction having 8 as the denominator.

= [(4/1) × (8/8)] = (32/8)

= [(7/8) × (1/1)] = (7/8)

Now,

= (32/8) + (7/8)

= [(32 + 7)/8]

= (39/8)

= $4\frac{7}{8}$

(iii) (3/5) + (2/7)

Solution:-

For addition of two unlike fractions, first change them to the like fractions.

LCM of 5, 7 = 35

Now, let us change each of the given fraction into an equivalent fraction having 35 as the denominator.

= [(3/5) × (7/7)] = (21/35)
= [(2/7) × (5/5)] = (10/35)

Now,

= (21/35) + (10/35)
= [(21 + 10)/35]
= (31/35)

(iv) (9/11) – (4/15)

Solution:-

For subtraction of two unlike fractions, first change them to the like fractions.

LCM of 11, 15 = 165

Now, let us change each of the given fraction into an equivalent fraction having 165 as the denominator.

= [(9/11) × (15/15)] = (135/165)
= [(4/15) × (11/11)] = (44/165)

Now,

= (135/165) - (44/165)
= [(135 – 44)/165]
= (91/165)

(v) (7/10) + (2/5) + (3/2)

Solution:-

For addition of two unlike fractions, first change them to the like fractions.

LCM of 10, 5, 2 = 10

Now, let us change each of the given fraction into an equivalent fraction having 35 as the denominator.

= [(7/10) × (1/1)] = (7/10)
= [(2/5) × (2/2)] = (4/10)
= [(3/2) × (5/5)] = (15/10)

Now,

= (7/10) + (4/10) + (15/10)
= [(7 + 4 + 15)/10]
= (26/10)
= (13/5)
= $2\frac{3}{5}$

(vi) $2\frac{2}{3} + 3\frac{1}{2}$

Solution:-

First convert mixed fraction into improper fraction,

= $2\frac{2}{3}$ = 8/3

= 3 ½ = 7/2

For addition of two unlike fractions, first change them to the like fractions.

LCM of 3, 2 = 6

Now, let us change each of the given fraction into an equivalent fraction having 6 as the denominator.

= [(8/3) × (2/2)] = (16/6)

= [(7/2) × (3/3)] = (21/6)

Now,

= (16/6) + (21/6)

= [(16 + 21)/6]

= (37/6)

= $6\frac{1}{6}$

(vii) $8\frac{1}{2} + 3\frac{5}{8}$

Solution:-

First convert mixed fraction into improper fraction,

= 8 ½ = 17/2

= $3\frac{5}{8}$ = 29/8

For Subtraction of two unlike fractions, first change them to the like fractions.

LCM of 2, 8 = 8

Now, let us change each of the given fraction into an equivalent fraction having 35 as the denominator.

= [(17/2) × (4/4)] = (68/8)

= [(29/8) × (1/1)] = (29/8)

Now,

= (68/8) - (29/8)

= [(68 - 29)/8]

= (39/8)

= $4\frac{7}{8}$

2. Arrange the following in descending order:

(i) 2/9, 2/3, 8/21

Solution:-

LCM of 9, 3, 21 = 63

Now, let us change each of the given fraction into an equivalent fraction having 63 as the denominator.

$[(2/9) \times (7/7)] = (14/63)$

$[(2/3) \times (21/21)] = (42/63)$

$[(8/21) \times (3/3)] = (24/63)$

Clearly,

$(42/63) > (24/63) > (14/63)$

Hence,

$(2/3) > (8/21) > (2/9)$

Hence, the given fractions in descending order are (2/3), (8/21), (2/9)

(ii) 1/5, 3/7, 7/10

Solution:-

LCM of 5, 7, 10 = 70

Now, let us change each of the given fraction into an equivalent fraction having 70 as the denominator.

$[(1/5) \times (14/14)] = (14/70)$

$[(3/7) \times (10/10)] = (30/70)$

$[(7/10) \times (7/7)] = (49/70)$

Clearly,

$(49/70) > (30/70) > (14/70)$

Hence,

$(7/10) > (3/7) > (1/5)$

Hence, the given fractions in descending order are (7/10), (3/7), (1/5)

3. In a "magic square", the sum of the numbers in each row, in each column and along the diagonals is the same. Is this a magic square?

4/11	9/11	2/11
3/11	5/11	7/11
8/11	1/11	6/11

Solution:-

Sum along the first row = (4/11) + (9/11) + (2/11) = (15/11)

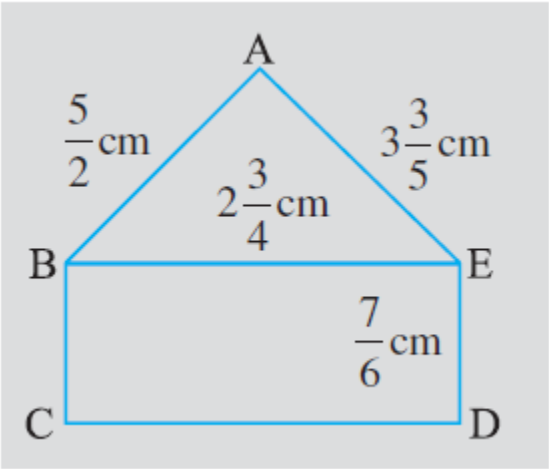
Sum along the second row = (3/11) + (5/11) + (7/11) = (15/11)

Sum along the third row = (8/11) + (1/11) + (6/11) = (15/11)

Sum along the first column = (4/11) + (3/11) + (8/11) = (15/11)
Sum along the second column = (9/11) + (5/11) + (1/11) = (15/11)
Sum along the third column = (2/11) + (7/11) + (6/11) = (15/11)
Sum along the first diagonal = (4/11) + (5/11) + (6/11) = (15/11)
Sum along the second diagonal = (2/11) + (5/11) + (8/11) = (15/11)
Yes. The sum of the numbers in each row, in each column and along the diagonals is the same, so it is a magic square.

4. A rectangular sheet of paper is 12 ½ cm long and $10\frac{2}{3}$ cm wide. Find its perimeter.
Solution:-
From the question, it is given that,
Length = 12 ½ cm = 25/2 cm
Breadth = $10\frac{2}{3}$ cm = 32/3 cm
We know that,
Perimeter of the rectangle = 2 × (length + breadth)
= 2 × [(25/2) + (32/3)]
= 2 × {[(25 × 3) + (32 × 2)]/6}
= 2 × [(75 + 64)/6]
= 2 × [139/6]
= 139/3 cm
Hence, the perimeter of the sheet of paper is $46\frac{1}{3}$ cm

5. Find the perimeters of (i) Triangle ABE (ii) the rectangle BCDE in this figure. Whose perimeter is greater?



Solution:-

From the fig,

AB = (5/2) cm

AE = $3\frac{3}{5}$ = 18/5 cm

BE = $2\frac{3}{4}$ = 11/4 cm

ED = 7/6 cm

(i) We know that,

Perimeter of the triangle = Sum of all sides

Then,

Perimeter of triangle ABE = AB + BE + EA

= (5/2) + (11/4) + (18/5)

The LCM of 2, 4, 5 = 20

Now, let us change each of the given fraction into an equivalent fraction having 20 as the denominator.

= {[(5/2) × (10/10)] + [(11/4) × (5/5)] + [(18/5) × (4/4)]}

= (50/20) + (55/20) + (72/20)

= (50 + 55 + 72)/20

= 177/20

= $8\frac{17}{20}$ cm

(ii) Now, we have to find the perimeter of the rectangle,

We know that,

Perimeter of the rectangle = 2 × (length + breadth)

Then,

Perimeter of rectangle BCDE = 2 × (BE + ED)

= 2 × [(11/4) + (7/6)]

The LCM of 4, 6 = 12

Now, let us change each of the given fraction into an equivalent fraction having 20 as the denominator

= 2 × {[(11/4) × (3/3)] + [(7/6) × (2/2)]}

= 2 × [(33/12) + (14/12)]

= 2 × [(33 + 14)/12]

= 2 × (47/12)

= 47/6

= $7\frac{5}{6}$

Finally, we have find which one is having greater perimeter.

Perimeter of triangle ABE = (177/20)

Perimeter of rectangle BCDE = (47/6)

The two perimeters are in the form of unlike fraction.
Changing perimeters into like fractions we have,
(177/20) = (177/20) × (3/3) = 531/60
(43/6) = (43/6) × (10/10) = 430/60
Clearly, (531/60) > (430/60)
Hence, (177/20) > (43/6)
∴ Perimeter of Triangle ABE > Perimeter of Rectangle (BCDE)

6. Salil wants to put a picture in a frame. The picture is $7\frac{3}{5}$ cm wide. To fit in the frame the picture cannot be more than $7\frac{3}{10}$ cm wide. How much should the picture be trimmed?

Solution:-

From the question, it is given that,

Picture having a width of = $7\frac{3}{5}$ = 38/5 cm

Frame having a width of = $7\frac{3}{10}$ = 73/10 cm

∴The picture should be trimmed by = [(38/5) – (73/10)]

The LCM of 5, 10 = 10

Now, let us change each of the given fraction into an equivalent fraction having 10 as the denominator.

= [(38/5) × (2/2)] – [(73/10) × (1/1)]
= (76/10) – (73/10)
= (76 - 73)/10
= 3/10 cm

Thus, the picture should be trimmed by (3/10) cm

7. Ritu ate (3/5) part of an apple and the remaining apple was eaten by her brother Somu. How much part of the apple did Somu eat? Who had the larger share? By how much?

Solution:-

From the question, it is given that,

Part of apple eaten by Ritu is = (3/5)

Part of apple eaten by Somu is = 1 – Part of apple eaten by Ritu

= 1 – (3/5)

The LCM of 1, 5 = 5

Now, let us change each of the given fraction into an equivalent fraction having 10 as the denominator.

= [(1/1) × (5/5)] – [(3/5) × (1/1)]
= (5/5) – (3/5)
= (5 - 3)/5
= 2/5

∴ Part of apple eaten by Somu is (2/5)

So, (3/5) > (2/5) hence, Ritu ate larger size of apple.

Now, the difference between the 32 shares = (3/5) – (2/5)

= (3 - 2)/5
= 1/5

Thus, Ritu's share is larger than share of Somu by (1/5)

8. Michael finished colouring a picture in (7/12) hour. Vaibhav finished colouring the same picture in (3/4) hour. Who worked longer? By what fraction was it longer?

Solution:-

From the question, it is given that,

Time taken by the Michael to colour the picture is = (7/12)

Time taken by the Vaibhav to colour the picture is = (3/4)

The LCM of 12, 4 = 12

Now, let us change each of the given fraction into an equivalent fraction having 12 as the denominator.

(7/12) = (7/12) × (1/1) = 7/12

(3/4) = (3/4) × (3/3) = 9/12

Clearly, (7/12) < (9/12)

Hence, (7/12) < (3/4)

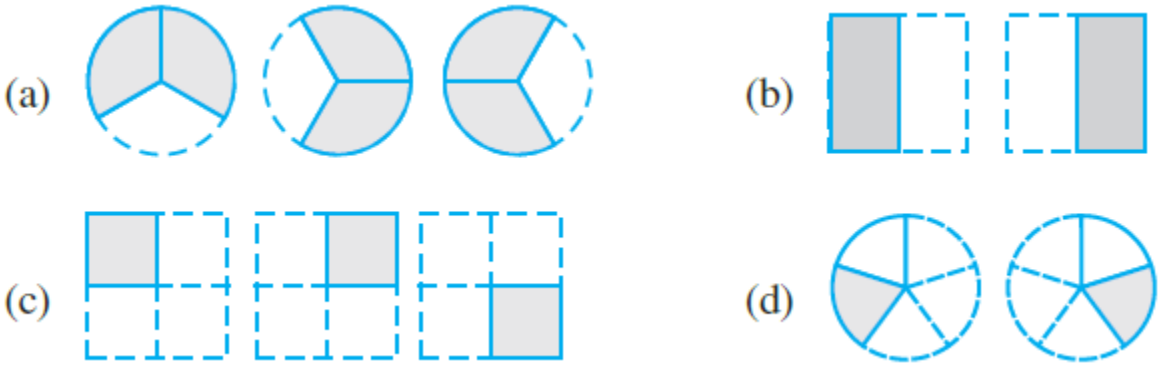
Thus, Vaibhav worked for longer time.

So, Vaibhav worked longer time by = (3/4) – (7/12)

= (9/12) – (7/12)
= (9 - 7)/12
= (2/12)
= (1/6) of an hour.

Exercise 2.2

1. Which of the drawings (a) to (d) show:
(i) 2 × (1/5) (ii) 2 × ½ (iii) 3 × (2/3) (iv) 3 × ¼



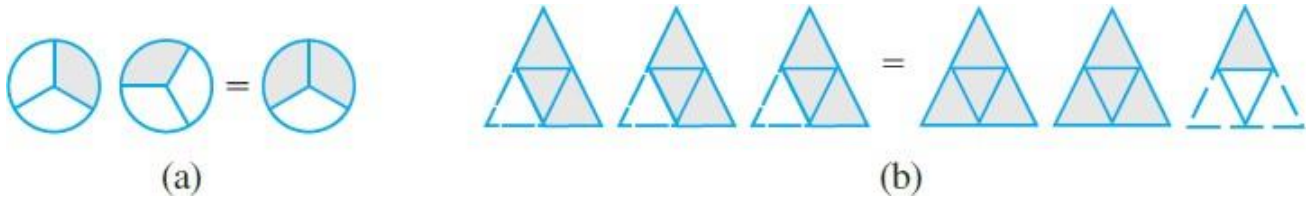
Solution:-
(i) 2 × (1/5) represents the addition of 2 figures, each represents 1 shaded part out of the given 5 equal parts.
∴ 2 × (1/5) is represented by fig (d).

(ii) 2 × ½ represents the addition of 2 figures, each represents 1 shaded part out of the given 2 equal parts.
∴ 2 × ½ is represented by fig (b).

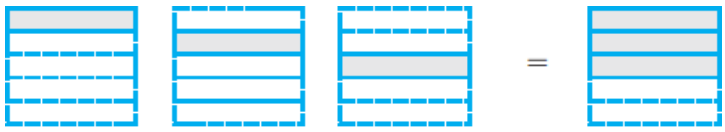
(iii) 3 × (2/3) represents the addition of 3 figures, each represents 2 shaded part out of the given 3 equal parts.
∴ 3 × (2/3) is represented by fig (a).

(iii) 3 × ¼ represents the addition of 3 figures, each represents 1 shaded part out of the given 4 equal parts.
∴ 3 × ¼ is represented by fig (c).

2. Some pictures (a) to (c) are given below. Tell which of them show:
(i) 3 × (1/5) = (3/5) (ii) 2 × (1/3) = (2/3) (iii) 3 × (3/4) = 2 ¼



(a) (b)



(c)

Solution:-

(i) 3 × (1/5) represents the addition of 3 figures, each represents 1 shaded part out of the given 5 equal parts and (3/5) represents 3 shaded parts out of 5 equal parts.

∴ 3 × (1/5) = (3/5) is represented by fig (c).

(ii) 2 × (1/3) represents the addition of 2 figures, each represents 1 shaded part out of the given 3 equal parts and (2/3) represents 2 shaded parts out of 3 equal parts.

∴ 2 × (1/3) = (2/3) is represented by fig (a).

(iii) 3 × (3/4) represents the addition of 3 figures, each represents 3 shaded part out of the given 4 equal parts and 2 ¼ represents 2 fully and 1 figure having 1 part as shaded out of 4 equal parts.

∴ 3 × (3/4) = 2 ¼ is represented by fig (b).

3. Multiply and reduce to lowest form and convert into a mixed fraction:

(i) 7 × (3/5)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (7/1) × (3/5)

= (7 × 3)/ (1 × 5)

= (21/5)

= $4\frac{1}{5}$

(ii) 4 × (1/3)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (4/1) × (1/3)

= (4 × 1)/ (1 × 3)

= (4/3)
= $1\frac{1}{3}$

(iii) 2 × (6/7)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2/1) × (6/7)
= (2 × 6)/ (1 × 7)
= (12/7)
= $1\frac{5}{7}$

(iv) 5 × (2/9)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (5/1) × (2/9)
= (5 × 2)/ (1 × 9)
= (10/9)
= $1\frac{1}{9}$

(v) (2/3) × 4

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2/3) × (4/1)
= (2 × 4)/ (3 × 1)
= (8/3)
= $2\frac{2}{3}$

(vi) (5/2) × 6

Solution:-

By the rule Multiplication of fraction

Product of fraction = (product of numerator)/ (product of denominator)
Then,

= (5/2) × (6/1)
= (5 × 6)/ (2 × 1)
= (30/2)
= 15

(vii) 11 × (4/7)
Solution:-
By the rule Multiplication of fraction,
Product of fraction = (product of numerator)/ (product of denominator)
Then,

= (11/1) × (4/7)
= (11 × 4)/ (1 × 7)
= (44/7)
= $6\frac{2}{7}$

(viii) 20 × (4/5)
Solution:-
By the rule Multiplication of fraction,
Product of fraction = (product of numerator)/ (product of denominator)
Then,

= (20/1) × (4/5)
= (20 × 4)/ (1 × 5)
= (80/5)
= 16

(ix) 13 × (1/3)
Solution:-
By the rule Multiplication of fraction,
Product of fraction = (product of numerator)/ (product of denominator)
Then,

= (13/1) × (1/3)
= (13 × 1)/ (1 × 3)
= (13/3)
= $4\frac{1}{3}$

(x) 15 × (3/5)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (15/1) × (3/5)

= (15 × 3)/ (1 × 5)

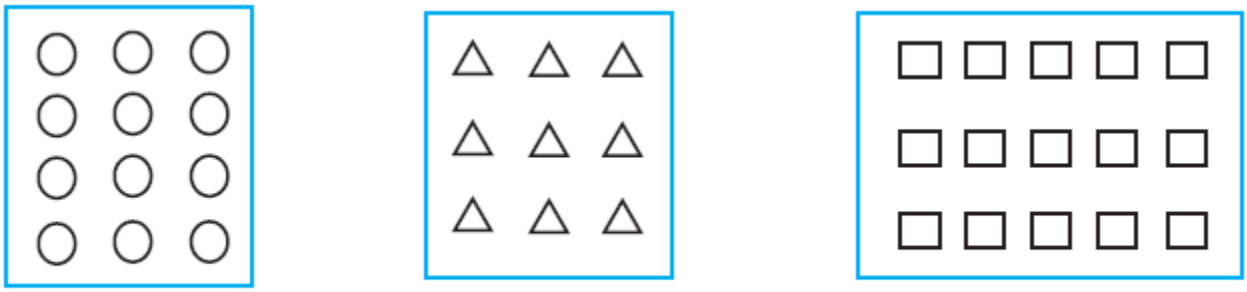
= (45/5)

= 9

4. Shade:

(i) ½ of the circles in box (a) **(b) 2/3 of the triangles in box (b)**

(iii) 3/5 of the squares in the box (c)



(a) (b) (c)

Solution:-

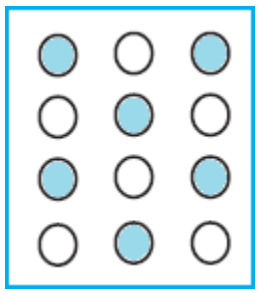
(i) From the question,

We may observe that there are 12 circles in the given box. So, we have to shade ½ of the circles in the box.

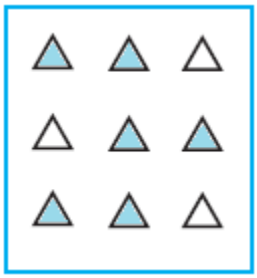
∴ 12 × ½ = 12/2

= 6

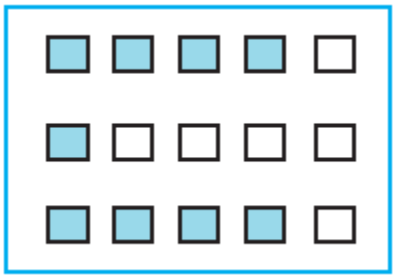
So we have to shade any 6 circles in the box.



(ii) From the question,
We may observe that there are 9 triangles in the given box. So, we have to shade 2/3 of the triangles in the box.
∴ 9 × (2/3) = 18/3
= 6
So we have to shade any 6 triangles in the box.



(iii) From the question,
We may observe that there are 15 squares in the given box. So, we have to shade 3/5 of the squares in the box.
∴ 15 × (3/5) = 45/5
= 9
So we have to shade any 9 squares in the box.



5. Find:
(a) ½ of (i) 24 (ii) 46
Solution:-
(i) 24
We have,
= ½ × 24
= 24/2
= 12
(ii) 46

We have,

= ½ × 46

= 46/2

= 23

(b) 2/3 of (i) 18 (ii) 27

Solution:-

(i) 18

We have,

= 2/3 × 18

= 2 × 6

= 12

(ii) 27

We have,

= 2/3 × 27

= 2 × 9

= 18

(c) ¾ of (i) 16 (ii) 36

Solution:-

(i) 16

We have,

= ¾ × 16

= 3 × 4

= 12

(ii) 36

We have

= ¾ × 36

= 3 × 9

= 27

(d) 4/5 of (i) 20 (ii) 35

Solution:-

(i) 20

We have,

= 4/5 × 20

= 4 × 4

= 16

(ii) 35

We have,

= 4/5 × 35

= 4 × 7

= 28

6. Multiply and express as a mixed fraction:

(a) 3 × $5\frac{1}{5}$

Solution:-

First convert the given mixed fraction into improper fraction.

= $5\frac{1}{5}$ = 26/5

Now,

= 3 × (26/5)

= 78/5

= $15\frac{3}{5}$

(b) 5 × 6 ¾

Solution:-

First convert the given mixed fraction into improper fraction.

= 6 ¾ = 27/4

Now,

= 5 × (27/4)

= 135/4

= 33 ¾

(c) 7 × 2 ¼

Solution:-

First convert the given mixed fraction into improper fraction.

= 2 ¼ = 9/4

Now,

= 7 × (9/4)

= 63/4

= 15 ¾

(d) 4 × $6\frac{1}{3}$

Solution:-

First convert the given mixed fraction into improper fraction.

= $6\frac{1}{3}$ = 19/3

Now,

= 4 × (19/3)

= 76/3

= $25\frac{1}{3}$

(e) 3 ¼ × 6

Solution:-

First convert the given mixed fraction into improper fraction.

= 3 ¼ = 13/4

Now,

= (13/4) × 6

= (13/2) × 3

= 39/2

= 19 ½

(f) $3\frac{2}{5}$ **× 8**

Solution:-

First convert the given mixed fraction into improper fraction.

= $3\frac{2}{5}$ = 17/5

Now,

= (17/5) × 8

= 136/5

= $27\frac{1}{5}$

7. Find:

(a) ½ of (i) 2 ¾ (ii) $4\frac{2}{9}$

Solution:-

(i) 2 ¾

First convert the given mixed fraction into improper fraction.

= 2 ¾ = 11/4

Now,

= ½ × 11/4

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)
Then,

= ½ × (11/4)
= (1 × 11)/ (2 × 4)
= (11/8)
= $1\frac{3}{8}$

(ii) $4\frac{2}{9}$

First convert the given mixed fraction into improper fraction.

= $4\frac{2}{9}$ = 38/9

Now,

= ½ × (38/9)

By the rule Multiplication of fraction,
Product of fraction = (product of numerator)/ (product of denominator)
Then,

= ½ × (38/9)
= (1 × 38)/ (2 × 9)
= (38/18)
= 19/9
= $2\frac{1}{9}$

(b) 5/8 of (i) $3\frac{5}{6}$ **(ii)** $9\frac{2}{3}$

Solution:-

(i) $3\frac{5}{6}$

First convert the given mixed fraction into improper fraction.

= $3\frac{5}{6}$ = 23/6

Now,

= (5/8) × (23/6)

By the rule Multiplication of fraction,
Product of fraction = (product of numerator)/ (product of denominator)
Then,

= (5/8) × (23/6)
= (5 × 23)/ (8 × 6)
= (115/48)
= $2\frac{19}{48}$

(ii) $9\frac{2}{3}$

First convert the given mixed fraction into improper fraction.

= $9\frac{2}{3}$ = 29/3

Now,

= (5/8) × (29/3)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (5/8) × (29/3)

= (5 × 29)/ (8 × 3)

= (145/24)

= $6\frac{1}{24}$

8. Vidya and Pratap went for a picnic. Their mother gave them a water bottle that contained 5 liters water. Vidya consumed 2/5 of the water. Pratap consumed the remaining water.

(i) How much water did Vidya drink?

(ii) What fraction of the total quantity of water did Pratap drink?

Solution:-

(i) From the question, it is given that,

Amount of water in the water bottle = 5 liters

Amount of water consumed by Vidya = 2/5 of 5 liters

= (2/5) × 5

= 2 liters

So, the total amount of water drank by Vidya is 2 liters

(ii) From the question, it is given that,

Amount of water in the water bottle = 5 liters

Then,

Amount of water consumed by Pratap = (1 – water consumed by Vidya)

= (1 – (2/5))

= (5-2)/5

= 3/5

∴ Total amount of water consumed by Pratap = 3/5 of 5 liters

= (3/5) × 5

= 3 liters

So, the total amount of water drank by Pratap is 3 liters

Exercise 2.3

1. Find:

(i) ¼ of (a) ¼ (b) 3/5 (c) 4/3

Solution:-

(a) ¼

We have,

= ¼ × ¼

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= ¼ × ¼

= (1 × 1)/ (4 × 4)

= (1/16)

(b) 3/5

We have,

= ¼ × (3/5)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= ¼ × (3/5)

= (1 × 3)/ (4 × 5)

= (3/20)

(c) (4/3)

We have,

= ¼ × (4/3)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= ¼ × (4/3)

= (1 × 4)/ (4 × 3)

= (4/12)

= 1/3

(ii) 1/7 of (a) 2/9 (b) 6/5 (c) 3/10

Solution:-

(a) 2/9

We have,

= (1/7) × (2/9)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (1/7) × (2/9)

= (1 × 2)/ (7 × 9)

= (2/63)

(b) 6/5

We have,

= (1/7) × (6/5)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (1/7) × (6/5)

= (1 × 6)/ (7 × 5)

= (6/35)

(c) 3/10

We have,

= (1/7) × (3/10)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (1/7) × (3/10)

= (1 × 3)/ (7 × 10)

= (3/70)

2. Multiply and reduce to lowest form (if possible):

(i) (2/3) × $2\frac{2}{3}$

Solution:-

First convert the given mixed fraction into improper fraction.

= $2\frac{2}{3}$ = 8/3

Now,

= (2/3) × (8/3)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2 × 8)/ (3 × 3)

= (16/9)

= $1\frac{7}{9}$

(ii) (2/7) × (7/9)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2 × 7)/ (7 × 9)

= (2 × 1)/ (1 × 9)

= (2/9)

(iii) (3/8) × (6/4)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (3 × 6)/ (8 × 4)

= (3 × 3)/ (4 × 4)

= (9/16)

(iv) (9/5) × (3/5)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (9 × 3)/ (5 × 5)

= (27/25)

= $1\frac{2}{25}$

(v) (1/3) × (15/8)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (1 × 15)/ (3 × 8)

= (1 × 5)/ (1 × 8)

= (5/8)

(vi) (11/2) × (3/10)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (11 × 3)/ (2 × 10)

= (33/20)

= $1\frac{13}{20}$

(vii) (4/5) × (12/7)

Solution:-

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (4 × 12)/ (5 × 7)

= (48/35)

= $1\frac{13}{35}$

3. Multiply the following fractions:

(i) (2/5) × 5 ¼

Solution:-

First convert the given mixed fraction into improper fraction.

= 5 ¼ = 21/4

Now,

= (2/5) × (21/4)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2 × 21)/ (5 × 4)
= (1 × 21)/ (5 × 2)
= (21/10)
= $2\frac{1}{10}$

(ii) $6\frac{2}{5}$ × (7/9)

Solution:-

First convert the given mixed fraction into improper fraction.

= $6\frac{2}{5}$ = 32/5

Now,

= (32/5) × (7/9)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (32 × 7)/ (5 × 9)
= (224/45)
= $4\frac{44}{45}$

(iii) (3/2) × $5\frac{1}{3}$

Solution:-

First convert the given mixed fraction into improper fraction.

= $5\frac{1}{3}$ = 16/3

Now,

= (3/2) × (16/3)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (3 × 16)/ (2 × 3)
= (1 × 8)/ (1 × 1)
= 8

(iv) (5/6) × $2\frac{3}{7}$

Solution:-

First convert the given mixed fraction into improper fraction.

= $2\frac{3}{7}$ = 17/7

Now,

= (5/6) × (17/7)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (5 × 17)/ (6 × 7)

= (85/42)

= $2\frac{1}{42}$

(v) $3\frac{2}{5}$ × (4/7)

Solution:-

First convert the given mixed fraction into improper fraction.

= $3\frac{2}{5}$ = 17/5

Now,

= (17/5) × (4/7)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (17 × 4)/ (5 × 7)

= (68/35)

= $1\frac{33}{35}$

(vi) $2\frac{3}{5}$ × 3

Solution:-

First convert the given mixed fraction into improper fraction.

= $2\frac{3}{5}$ = 13/5

Now,

= (13/5) × (3/1)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (13 × 3)/ (5 × 1)

= (39/5)

$= 7\frac{4}{5}$

(vi) $3\frac{4}{7}$ **× (3/5)**

Solution:-

First convert the given mixed fraction into improper fraction.

$= 3\frac{4}{7}$ = 25/7

Now,

= (25/7) × (3/5)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (25 × 3)/ (7 × 5)

= (5 × 3)/ (7 × 1)

= (15/7)

$= 2\frac{1}{7}$

4. Which is greater:

(i) (2/7) of (3/4) or (3/5) of (5/8)

Solution:-

We have,

= (2/7) × (3/4) and (3/5) × (5/8)

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

= (2/7) × (3/4)

= (2 × 3)/ (7 × 4)

= (1 × 3)/ (7 × 2)

= (3/14) … [i]

And,

= (3/5) × (5/8)

= (3 × 5)/ (5 × 8)

= (3 × 1)/ (1 × 8)

= (3/8) … [ii]

Now, convert [i] and [ii] into like fractions,
LCM of 14 and 8 is 56
Now, let us change each of the given fraction into an equivalent fraction having 56 as the denominator.

$[(3/14) \times (4/4)] = (12/56)$

$[(3/8) \times (7/7)] = (21/56)$

Clearly,

$(12/56) < (21/56)$

Hence,

$(3/14) < (3/8)$

(ii) (1/2) of (6/7) or (2/3) of (3/7)

Solution:-

We have,

$= (1/2) \times (6/7)$ and $(2/3) \times (3/7)$

By the rule Multiplication of fraction,

Product of fraction = (product of numerator)/ (product of denominator)

Then,

$= (1/2) \times (6/7)$

$= (1 \times 6)/ (2 \times 7)$

$= (1 \times 3)/ (1 \times 7)$

$= (3/7)$ … [i]

And,

$= (2/3) \times (3/7)$

$= (2 \times 3)/ (3 \times 7)$

$= (2 \times 1)/ (1 \times 7)$

$= (2/7)$ … [ii]

By comparing [i] and [ii],

Clearly,

$(3/7) < (2/7)$

5. Saili plants 4 saplings, in a row, in her garden. The distance between two adjacent saplings is ¾ m. Find the distance between the first and the last sapling.

Solution:-

From the question, it is given that,

The distance between two adjacent saplings = ¾ m

Number of saplings planted by Saili in a row = 4

Then, number of gap in saplings = ¾ × 4

= 3

∴The distance between the first and the last saplings = 3 × ¾

= (9/4) m

= 2 ¼ m

Hence, the distance between the first and the last saplings is 2 ¼ m.

6. Lipika reads a book for 1 ¾ hours every day. She reads the entire book in 6 days. How many hours in all were required by her to read the book?

Solution:-

From the question, it is given that,

Lipika reads the book for = 1 ¾ hours every day = 7/4 hours

Number of days she took to read the entire book = 6 days

∴Total number of hours required by her to complete the book = (7/4) × 6

= (7/2) × 3

= 21/2

= 10 ½ hours

Hence, the total number of hours required by her to complete the book is 10 ½ hours.

7. A car runs 16 km using 1 litre of petrol. How much distance will it cover using 2 ¾ litres of petrol.

Solution:-

From the question, it is given that,

The total number of distance travelled by a car in 1 liter of petrol = 16 km

Then,

Total quantity of petrol = 2 ¾ liter = 11/4 liters

Total number of distance travelled by car in 11/4 liters of petrol = (11/4) × 16

= 11 × 4

= 44 km

∴Total number of distance travelled by car in 11/4 liters of petrol is 44 km.

8. (a) (i) provide the number in the box [ ], such that (2/3) × [ ] = (10/30)

Solution:-

Let the required number be x,

Then,

= (2/3) × (x) = (10/30)

By cross multiplication,

= x = (10/30) × (3/2)
= x = (10 × 3) / (30 × 2)
= x = (5 × 1) / (10 × 1)
= x = 5/10
∴The required number in the box is (5/20)

(ii) The simplest form of the number obtained in [ ] is
Solution:-
The number in the box is 5/10
Then,
The simplest form of 5/10 is ½

(b) (i) provide the number in the box [ ], such that (3/5) × [ ] = (24/75)
Solution:-
Let the required number be x,
Then,
= (3/5) × (x) = (24/75)
By cross multiplication,
= x = (24/75) × (5/3)
= x = (24 × 5) / (75 × 3)
= x = (8 × 1) / (15 × 1)
= x = 8/15
∴The required number in the box is (8/15)

(ii) The simplest form of the number obtained in [ ] is
Solution:-
The number in the box is 8/15
Then,
The simplest form of 8/15 is 8/15

Exercise 2.4

1. Find:

(i) 12 ÷ ¾

Solution:-

We have,

= 12 × reciprocal of ¾

= 12 × (4/3)

= 4 × 4

= 16

(ii) 14 ÷ (5/6)

Solution:-

We have,

= 14 × reciprocal of (5/6)

= 14 × (6/5)

= 84/5

(iii) 8 ÷ (7/3)

Solution:-

We have,

= 8 × reciprocal of (7/3)

= 8 × (3/7)

= (24/7)

(iv) 4 ÷ (8/3)

Solution:-

We have,

= 4 × reciprocal of (8/3)

= 4 × (3/8)

= 1 × (3/2)

= 3/2

(v) 3 ÷ $2\frac{1}{3}$

Solution:-

While dividing a whole number by a mixed fraction, first convert the mixed fraction into

improper fraction
We have,

= $2\frac{1}{3}$ = 7/3

Then,

= 3 ÷ (7/3)
= 3 × reciprocal of (7/3)
= 3 × (3/7)
= 9/7

(vi) 5 ÷ $3\frac{4}{7}$

Solution:-

While dividing a whole number by a mixed fraction, first convert the mixed fraction into improper fraction
We have,

Then,

= $3\frac{4}{7}$ ÷ 25/7

= 5 ÷ (25/7)
= 5 × reciprocal of (25/7)
= 5 × (7/25)
= 1 × (7/5)
= 7/5

2. Find the reciprocal of each of the following fractions. Classify the reciprocals as proper fractions, improper fractions and whole numbers.

(i) 3/7

Solution:-

Reciprocal of (3/7) is (7/3) [∵ ((3/7) × (7/3)) = 1]
So, it is an improper fraction.
Improper fraction is that fraction in which numerator is greater than its denominator.

(ii) 5/8

Solution:-

Reciprocal of (5/8) is (8/5) [∵ ((5/8) × (8/5)) = 1]
So, it is an improper fraction.
Improper fraction is that fraction in which numerator is greater than its denominator

(iii) 9/7
Solution:-
Reciprocal of (9/7) is (7/9) [∵ ((9/7) × (7/9)) = 1]
So, it is a proper fraction.
A proper fraction is that fraction in which denominator is greater than the numerator of the fraction.

(iv) 6/5
Solution:-
Reciprocal of (6/5) is (5/6) [∵ ((6/5) × (5/6)) = 1]
So, it is a proper fraction.
A proper fraction is that fraction in which denominator is greater than the numerator of the fraction.

(v) 12/7
Solution:-
Reciprocal of (12/7) is (7/12) [∵ ((12/7) × (7/12)) = 1]
So, it is a proper fraction.
A proper fraction is that fraction in which denominator is greater than the numerator of the fraction.

(vi) 1/8
Solution:-
Reciprocal of (1/8) is (8/1) or 8 [∵ ((1/8) × (8/1)) = 1]
So, it is a whole number.
Whole numbers are collection of all positive integers including 0.

(vii) 1/11
Solution:-
Reciprocal of (1/11) is (11/1) or 11 [∵ ((1/11) × (11/1)) = 1]
So, it is a whole number.
Whole numbers are collection of all positive integers including 0.

3. Find:
(i) (7/3) ÷ 2
Solution:-

We have,

= (7/3) × reciprocal of 2

= (7/3) × (1/2)

= (7 × 1) / (3 × 2)

= 7/6

= $1\frac{1}{6}$

(ii) (4/9) ÷ 5

Solution:-

We have,

= (4/9) × reciprocal of 5

= (4/9) × (1/5)

= (4 × 1) / (9 × 5)

= 4/45

(iii) (6/13) ÷ 7

Solution:-

We have,

= (6/13) × reciprocal of 7

= (6/13) × (1/7)

= (6 × 1) / (13 × 7)

= 6/91

(iv) $4\frac{1}{3}$ **÷ 3**

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= $4\frac{1}{3}$ = 13/3

Then,

= (13/3) × reciprocal of 3

= (13/3) × (1/3)

= (13 × 1) / (3 × 3)

= 13/9

(iv) 3 ½ ÷ 4

Solution:-

First covert the mixed fraction into improper fraction.
We have,
= 3 ½ = 7/2
Then,
= (7/2) × reciprocal of 4
= (7/2) × (1/4)
= (7 × 1) / (2 × 4)
= 7/8

(iv) $4\frac{3}{7}$ ÷ 7
Solution:-
First covert the mixed fraction into improper fraction.
We have,
= $4\frac{3}{7}$ = 31/7
Then,
= (31/7) × reciprocal of 7
= (31/7) × (1/7)
= (31 × 1) / (7 × 7)
= 31/49

4. Find:
(i) (2/5) ÷ (½)
Solution:-
We have,
= (2/5) × reciprocal of ½
= (2/5) × (2/1)
= (2 × 2) / (5 × 1)
= 4/5

(ii) (4/9) ÷ (2/3)
Solution:-
We have,
= (4/9) × reciprocal of (2/3)
= (4/9) × (3/2)
= (4 × 3) / (9 × 2)
= (2 × 1) / (3 × 1)

= 2/3

(iii) (3/7) ÷ (8/7)

Solution:-

We have,

= (3/7) × reciprocal of (8/7)

= (3/7) × (7/8)

= (3 × 7) / (7 × 8)

= (3 × 1) / (1 × 8)

= 3/8

(iv) $2\frac{1}{3}$ ÷ (3/5)

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= $2\frac{1}{3}$ = 7/3

Then,

= (7/3) × reciprocal of (3/5)

= (7/3) × (5/3)

= (7 × 5) / (3 × 3)

= 35/9

(v) 3 ½ ÷ (8/3)

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= 3 ½ = 7/2

Then,

= (7/2) × reciprocal of (8/3)

= (7/2) × (3/8)

= (7 × 3) / (2 × 8)

= 21/16

(vi) (2/5) ÷ 1 ½

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= 1 ½ = 3/2

Then,

= (2/5) × reciprocal of (3/2)

= (2/5) × (2/3)

= (2 × 2) / (5 × 3)

= 4/15

(vii) $3\frac{1}{5} \div 1\frac{2}{3}$

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= $3\frac{1}{5}$ = 16/5

= $1\frac{2}{3}$ = 5/3

Then,

= (16/5) × reciprocal of (5/3)

= (16/5) × (3/5)

= (16 × 3) / (5 × 5)

= 48/25

(viii) $2\frac{1}{5} \div 1\frac{1}{5}$

Solution:-

First covert the mixed fraction into improper fraction.

We have,

= $2\frac{1}{5}$ = 11/5

= $1\frac{1}{5}$ = 6/5

Then,

= (11/5) × reciprocal of (6/5)

= (11/5) × (5/6)

= (11 × 5) / (5 × 6)

= (11 × 1) / (1 × 6)

= 11/6

Exercise 2.5

1. Which is grater?

(i) 0.5 or 0.05

Solution:-

By comparing whole number, 0 = 0

By comparing the tenths place digit, 5 > 0

∴ 0.5 > 0.05

(ii) 0.7 or 0.5

Solution:-

By comparing whole number, 0 = 0

By comparing the tenths place digit, 7 > 5

∴ 0.7 > 0.5

(iii) 7 or 0.7

Solution:-

By comparing whole number, 7 > 0

∴ 7 > 0.7

(iv) 1.37 or 1.49

Solution:-

By comparing whole number, 1 = 1

By comparing the tenths place digit, 3 < 4

∴ 1.37 < 1.49

(v) 2.03 or 2.30

Solution:-

By comparing whole number, 2 = 2

By comparing the tenths place digit, 0 < 3

∴ 2.03 < 2.30

(vi) 0.8 or 0.88

Solution:-

By comparing whole number, 0 = 0

By comparing the tenths place digit, 8 = 8

By comparing the hundredths place digit, 0 < 8

$\therefore 0.8 < 0.88$

2. Express as rupees as decimals:

(i) 7 paise

Solution:-

We know that,

$= ₹ 1 = 100$ paise

$= 1$ paise $= ₹ (1/100)$

$\therefore$ 7 paise $= ₹ (7/100)$

$= ₹ 0.07$

(ii) 7 rupees 7 paise

Solution:-

We know that,

$= ₹ 1 = 100$ paise

$= 1$ paise $= ₹ (1/100)$

$\therefore$ 7 rupees 7 paise $= ₹ 7 + ₹ (7/100)$

$= ₹ 7 + ₹ 0.07$

$= ₹ 7.07$

(iii) 77 rupees 77 paise

Solution:-

We know that,

$= ₹ 1 = 100$ paise

$= 1$ paise $= ₹ (1/100)$

$\therefore$ 77 rupees 77 paise $= ₹ 77 + ₹ (77/100)$

$= ₹ 77 + ₹ 0.77$

$= ₹ 7.77$

(iv) 50 paise

Solution:-

We know that,

$= ₹ 1 = 100$ paise

$= 1$ paise $= ₹ (1/100)$

$\therefore$ 50 paise $= ₹ (50/100)$

$= ₹ 0.50$

(v) 235 paise

Solution:-

We know that,

= ₹ 1 = 100 paise

= 1 paise = ₹ (1/100)

∴ 235 paise = ₹ (235/100)

= ₹ 2.35

3. (i) Express 5 cm in meter and kilometer

Solution:-

We know that,

= 1 meter = 100 cm

Then,

= 1 cm = (1/100) m

= 5 cm = (5/100)

= 0.05 m

Now,

= 1 km = 1000 m

Then,

= 1 m = (1/1000) km

= 0.05 m = (0.05/1000)

= 0. 00005 km

(i) Express 35 mm in cm, m and km

Solution:-

We know that,

= 1 cm = 10 mm

Then,

= 1 mm = (1/10) cm

= 35 mm = (35/10) cm

= 3.5 cm

And,

= 1 meter = 100 cm

Then,

= 1 cm = (1/100) m

= 3.5 cm = (3.5/100) m

= (35/1000) m

= 0.035 m

Now,

= 1 km = 1000 m

Then,

= 1 m = (1/1000) km

= 0.035 m = (0.035/1000)

= 0. 000035 km

4. Express in kg:

(i) 200 g

Solution:-

We know that,

= 1 kg = 1000 g

Then,

= 1 g = (1/1000) kg

= 200 g = (200/1000) kg

= (2/10)

= 0.2 kg

(ii) 3470 g

Solution:-

We know that,

= 1 kg = 1000 g

Then,

= 1 g = (1/1000) kg

= 3470 g = (3470/1000) kg

= (3470/100)

= 3.470 kg

(ii) 4 kg 8 g

Solution:-

We know that,

= 1 kg = 1000 g

Then,

= 1 g = (1/1000) kg

= 4 kg 8 g = 4 kg + (8/1000) kg

= 4 kg + 0.008

= 4.008 kg

5. Write the following decimal numbers in the expanded form:
(i) 20.03
Solution:-
We have,
20.03 = (2 × 10) + (0 × 1) + (0 × (1/10)) + (3 × (1/100))

(ii) 2.03
Solution:-
We have,
2.03 = (2 × 1) + (0 × (1/10)) + (3 × (1/100))

(iii) 200.03
Solution:-
We have,
200.03 = (2 × 100) + (0 × 10) + (0 × 1) + (0 × (1/10)) + (3 × (1/100))

(iv) 2.034
Solution:-
We have,
2.03 = (2 × 1) + (0 × (1/10)) + (3 × (1/100)) + (4 × (1/1000))

6. Write the place value of 2 in the following decimal numbers:
(i) 2.56
Solution:-
From the question, we observe that,
The place value of 2 in 2.56 is ones

(ii) 21.37
Solution:-
From the question, we observe that,
The place value of 2 in 21.37 is tens

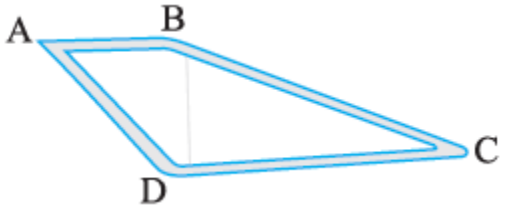
(iii) 10.25
Solution:-
From the question, we observe that,

The place value of 2 in 10.25 is tenths.

(iv) 9.42
Solution:-
From the question, we observe that,
The place value of 2 in 9.42 is hundredth.

(v) 63.352
Solution:-
From the question, we observe that,
The place value of 2 in 63.352 is thousandth.

7. Dinesh went from place A to place B and from there to place C. A is 7.5 km from B and B is 12.7 km from C. Ayub went from place A to place D and from there to place C. D is 9.3 km from A and C is 11.8 km from D. Who travelled more and by how much?



Solution:-
From the question, it is given that,
Distance travelled by Dinesh = AB + BC
= 7.5 + 12.7
= 20.2 km
∴Dinesh travelled 20.2 km
Distance travelled by Ayub = AD + DC
= 9.3 + 11.8
= 21.1 km
∴Ayub travelled 21.1km
Clearly, Ayub travelled more distance by = (21.1 – 20.2)
= 0.9 km
∴Ayub travelled 0.9 km more than Dinesh.

8. Shyama bought 5 kg 300 g apples and 3 kg 250 g mangoes. Sarala bought 4 kg 800 g oranges and 4 kg 150 g bananas. Who bought more fruits?

Solution:-

From the question, it is given that,

Fruits bought by Shyama = 5 kg 300 g

= 5 kg + (300/1000) kg

= 5 kg + 0.3 kg

= 5.3 kg

Fruits bought by Sarala = 4 kg 800 g + 4 kg 150 g

= (4 + (800/1000)) + (4 + (150/1000))

= (4 + 0.8) kg + (4 + .150) kg

= 4.8 kg + 4.150kg

= 8.950 kg

So, Sarala bought more fruits.

9. How much less is 28 km than 42.6 km?

Solution:-

Now, we have to find the difference of 42.6 km and 28 km

42.6

-28.0

14.6

∴ 14.6 km less is 28 km than 42.6 km.

Exercise 2.6

FIND:

(i) 0.2 × 6

Solution:-

We have,

= (2/10) × 6

= (12/10)

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

= 1.2

(ii) 8 × 4.6

Solution:-

We have,

= (8) × (46/10)

= (368/10)

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

= 36.8

(iii) 2.71 × 5

Solution:-

We have,

= (271/100) × 5

= (1355/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 13.55

(iv) 20.1 × 4

Solution:-

We have,

= (201/10) × 4

= (804/10)

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

= 80.4

(v) 0.05 × 7

Solution:-

We have,

= (5/100) × 7

= (35/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 0.35

(vi) 211.02 × 4

Solution:-

We have,

= (21102/100) × 4

= (84408/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 844.08

(vii) 2 × 0.86

Solution:-

We have,

= (2) × (86/100)

= (172/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 1.72

2. Find the area of rectangle whose length is 5.7cm and breadth is 3 cm.

Solution:-

From the question, it is given that,

Length of the rectangle = 5.7 cm

Breadth of the rectangle = 3 cm

Then,

Area of the rectangle = length × Breadth

= 5.7 × 3

$= 17.1\ cm^2$

3. Find:

(i) 1.3 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

$= 1.3 \times 10 = 13$

(ii) 36.8 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

$= 36.8 \times 10 = 368$

(iii) 153.7 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

$= 153.7 \times 10 = 1537$

(iv) 168.07 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

$= 168.07 \times 10 = 1680.7$

(v) 31.1 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
We have,

$= 31.1 \times 100 = 3110$

(vi) 156.1 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
We have,

= 156.1 × 100 = 15610

(vii) 3.62 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
We have,

= 3.62 × 100 = 362

(viii) 43.07 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
We have,

= 43.07 × 100 = 4307

(ix) 0.5 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

= 0.5 × 10 = 5

(x) 0.08 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place.
We have,

= 0.08 × 10 = 0.8

(xi) 0.9 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.
We have,

= 0.9 × 100 = 90

(xii) 0.03 × 1000

Solution:-

On multiplying a decimal by 1000, the decimal point is shifted to the right by three places.
We have,

= 0.03 × 1000 = 30

4. A two-wheeler covers a distance of 55.3 km in one litre of petrol. How much distance will it cover in 10 litres of petrol?

Solution:-

From the question, it is given that,

Distance covered by two-wheeler in 1L of petrol = 55.3 km

Then,

Distance covered by two wheeler in 10L of petrol = (10 × 55.3)

= 553 km

∴Two-wheeler covers a distance in 10L of petrol is 553 km.

5. Find:

(i) 2.5 × 0.3

Solution:-

We have,

= (25/10) × (3/10)

= (75/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 0.75

(ii) 0.1 × 51.7

Solution:-

We have,

= (1/10) × (517/10)

= (517/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 5.17

(iii) 0.2 × 316.8

Solution:-

We have,

= (2/10) × (3168/10)

= (6336/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 63.36

(iv) 1.3 × 3.1

Solution:-

We have,

= (13/10) × (31/10)

= (403/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 4.03

(v) 0.5 × 0.05

Solution:-

We have,

= (5/10) × (5/100)

= (25/1000)

On dividing a decimal by 1000, the decimal point is shifted to the left by three places.

Then,

= 0.025

(vi) 11.2 × 0.15

Solution:-

We have,

= (112/10) × (15/100)

= (1680/1000)

On dividing a decimal by 1000, the decimal point is shifted to the left by three places.

Then,

= 1.680

(vii) 1.07 × 0.02

Solution:-

We have,

= (107/100) × (2/100)

= (214/10000)

On dividing a decimal by 10000, the decimal point is shifted to the left by four places.

Then,

= 0.0214

(viii) 10.05 × 1.05

Solution:-

We have,

= (1005/100) × (105/100)

= (105525/10000)

On dividing a decimal by 10000, the decimal point is shifted to the left by four places. Then,

= 10.5525

(ix) 101.01 × 0.01

Solution:-

We have,

= (10101/100) × (1/100)

= (10101/10000)

On dividing a decimal by 10000, the decimal point is shifted to the left by four places. Then,

= 1.0101

(x) 100.01 × 1.1

Solution:-

We have,

= (10001/100) × (11/10)

= (110011/1000)

On dividing a decimal by 1000, the decimal point is shifted to the left by three places. Then,

= 110.011

Exercise 2.7

1. Find:

(i) 0.4 ÷ 2

Solution:-

We have,

$= (4/10) \div 2$

Then,

$= (4/10) \times (1/2)$

$= (2/10) \times (1/1)$

$= (2/10)$

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

$= 0.2$

(ii) 0.35 ÷ 5

Solution:-

We have,

$= (35/100) \div 5$

Then,

$= (35/100) \times (1/5)$

$= (7/100) \times (1/1)$

$= (7/100)$

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

$= 0.07$

(iii) 2.48 ÷ 4

Solution:-

We have,

$= (248/100) \div 4$

Then,

$= (248/100) \times (1/4)$

$= (62/100) \times (1/1)$

$= (62/100)$

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 0.62

(iv) 65.4 ÷ 6

Solution:-

We have,

= (654/10) ÷ 6

Then,

= (654/10) × (1/6)

= (109/10) × (1/1)

= (109/10)

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

= 10.9

(v) 651.2 ÷ 4

Solution:-

We have,

= (6512/10) ÷ 4

Then,

= (6512/10) × (1/4)

= (1628/10) × (1/1)

= (1628/10)

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

Then,

= 162.8

(vi) 14.49 ÷ 7

Solution:-

We have,

= (1449/100) ÷ 7

Then,

= (1449/100) × (1/7)

= (207/100) × (1/1)

= (207/100)

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

= 2.07

(vii) 3.96 ÷ 4

Solution:-

We have,

$= (396/100) \div 4$

Then,

$= (396/100) \times (1/4)$

$= (99/100) \times (1/1)$

$= (99/100)$

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

$= 0.99$

(viii) 0.80 ÷ 5

Solution:-

We have,

$= (80/100) \div 5$

Then,

$= (80/100) \times (1/5)$

$= (16/100) \times (1/1)$

$= (16/100)$

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

Then,

$= 0.16$

2. Find:

(i) 4.8 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

$= 4.8 \div 10$

$= (4.8/10)$

$= 0.48$

(ii) 52.5 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 52.5 ÷ 10

= (52.5/10)

= 5.25

(iii) 0.7 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 0.7 ÷ 10

= (0.7/10)

= 0.07

(iv) 33.1 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 33.1 ÷ 10

= (33.1/10)

= 3.31

(v) 272.23 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 272.23 ÷ 10

= (272.23/10)

= 27.223

(vi) 0.56 ÷ 10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 0.56 ÷ 10

= (0.56/10)

= 0.056

(vii) 3.97 ÷10

Solution:-

On dividing a decimal by 10, the decimal point is shifted to the left by one place.

We have,

= 3.97 ÷ 10

= (3.97/10)

= 0.397

3. Find:

(i) 2.7 ÷ 100

Solution:-

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

We have,

= 2.7 ÷ 100

= (2.7/100)

= 0.027

(ii) 0.3 ÷ 100

Solution:-

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

We have,

= 0.3 ÷ 100

= (0.3/100)

= 0.003

(iii) 0.78 ÷ 100

Solution:-

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

We have,

= 0.78 ÷ 100

= (0.78/100)

= 0.0078

(iv) 432.6 ÷ 100

Solution:-

On dividing a decimal by 100, the decimal point is shifted to the left by two places.

We have,

= 432.6 ÷ 100
= (432.6/100)
= 4.326

(v) 23.6 ÷100
Solution:-
On dividing a decimal by 100, the decimal point is shifted to the left by two places.
We have,
= 23.6 ÷ 100
= (23.6/100)
= 0.236

(vi) 98.53 ÷ 100
Solution:-
On dividing a decimal by 100, the decimal point is shifted to the left by two places.
We have,
= 98.53 ÷ 100
= (98.53/100)
= 0.9853

4. Find:
(i) 7.9 ÷ 1000
Solution:-
On dividing a decimal by 1000, the decimal point is shifted to the left by three places.
We have,
= 7.9 ÷ 1000
= (7.9/1000)
= 0.0079

(ii) 26.3 ÷ 1000
Solution:-
On dividing a decimal by 1000, the decimal point is shifted to the left by three places.
We have,
= 26.3 ÷ 1000
= (26.3/1000)
= 0.0263

(iii) 38.53 ÷ 1000

Solution:-

On dividing a decimal by 1000, the decimal point is shifted to the left by three places.

We have,

= 38.53 ÷ 1000

= (38.53/1000)

= 0.03853

(iv) 128.9 ÷ 1000

Solution:-

On dividing a decimal by 1000, the decimal point is shifted to the left by three places.

We have,

= 128.9 ÷ 1000

= (128.9/1000)

= 0.1289

(v) 0.5 ÷ 1000

Solution:-

On dividing a decimal by 1000, the decimal point is shifted to the left by three places.

We have,

= 0.5 ÷ 1000

= (0.5/1000)

= 0.0005

5. Find:

(i) 7 ÷ 3.5

Solution:-

We have,

= 7 ÷ (35/10)

= 7 × (10/35)

= 1 × (10/5)

= 2

(ii) 36 ÷ 0.2

Solution:-

We have,

= 36 ÷ (2/10)

= 36 × (10/2)
= 18 × 10
= 180

(iii) 3.25 ÷ 0.5
Solution:-
We have,
= (325/100) ÷ (5/10)
= (325/100) × (10/5)
= (325 × 10)/ (100 × 5)
= (65 × 1)/ (10 × 1)
= 65/10
= 6.5

(iv) 30.94 ÷ 0.7
Solution:-
We have,
= (3094/100) ÷ (7/10)
= (3094/100) × (10/7)
= (3094 × 10)/ (100 × 7)
= (442 × 1)/ (10 × 1)
= 442/10
= 44.2

(v) 0.5 ÷ 0.25
Solution:-
We have,
= (5/10) ÷ (25/100)
= (5/10) × (100/25)
= (5 × 100)/ (10 × 25)
= (1 × 10)/ (1 × 5)
= 10/5
= 2

(vi) 7.75 ÷ 0.25
Solution:-
We have,

= (775/100) ÷ (25/100)
= (775/100) × (100/25)
= (775 × 100)/ (100 × 25)
= (155 × 1)/ (1 × 5)
= (31 × 1)/ (1 × 1)
= 31

(vii) 76.5 ÷ 0.15
Solution:-
We have,
= (765/10) ÷ (15/100)
= (765/10) × (100/15)
= (765 × 100)/ (10 × 15)
= (51 × 10)/ (1 × 1)
= 510

(viii) 37.8 ÷ 1.4
Solution:-
We have,
= (378/10) ÷ (14/10)
= (378/10) × (10/14)
= (378 × 10)/ (10 × 14)
= (27 × 1)/ (1 × 1)
= 27

(ix) 2.73 ÷ 1.3
Solution:-
We have,
= (273/100) ÷ (13/10)
= (273/100) × (10/13)
= (273 × 10)/ (100 × 13)
= (21 × 1)/ (10 × 1)
= 21/10
= 2.1

6. A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will

it cover in one litre of petrol?

Solution:-

From the question, it is given that,

Total distance covered by vehicle in 2.4 litres of petrol = 43.2 km

Then,

Distance covered in 1 litre of petrol = 43.2 ÷ 2.4

= (432/10) ÷ (24/10)

= (432/10) × (10/24)

= (432 × 10)/ (10 × 24)

= (36 × 1)/ (1 × 2)

= (18 × 1)/ (1 × 1)

= 18 km

∴Total distance covered in 1 liter of petrol is 18 km.

DELHI PUBLIC SCHOOL GANDHINAGAR

Welcome

to the

Online Virtual Class

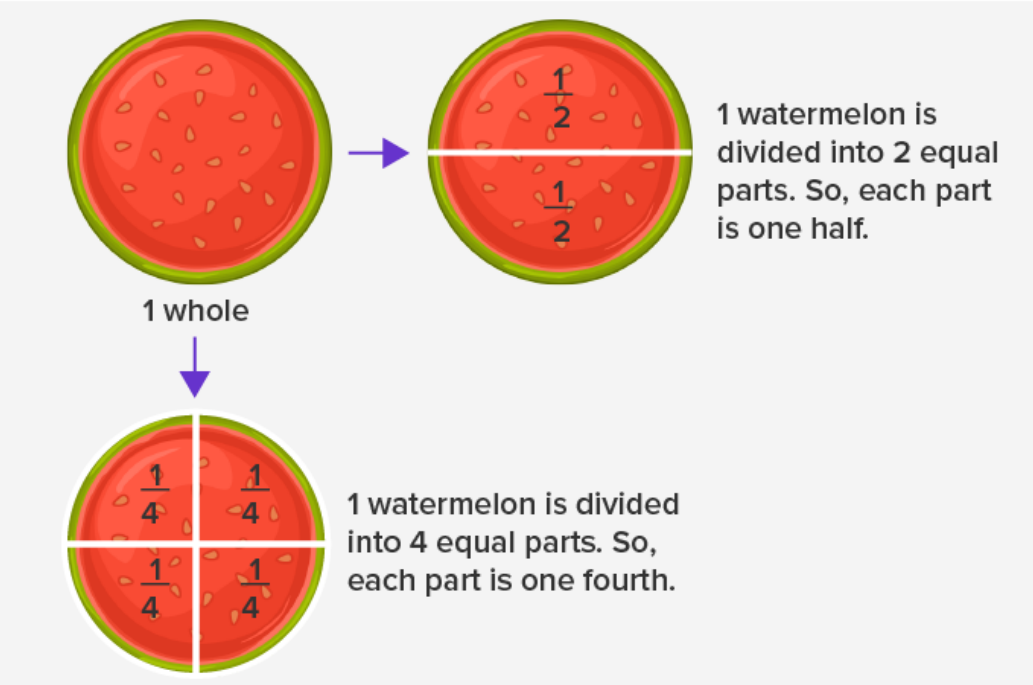
Do's & Don'ts

- *Student must keep a notepad and pen to make notes.*
- *Students are not allowed to unmute the audio. You will get two minutes at last to solve your query.*
- *Students to enter their name while entering the meeting room and they are not allowed to mute video.*
- *Don't waste your time in changing your profile video background. Everyone knows that you are expert in technology, no need to prove. Its better to concentrate in class.*
- *Screen sharing and scribbling is not allowed at any cost.*
- *Discipline and decorum to be maintained.*
- *These classes once completed online, will not be repeated again in actual class room. Hence, pay attention and don't be absent.*

CHAPTER 2
FRACTIONS AND DECIMALS

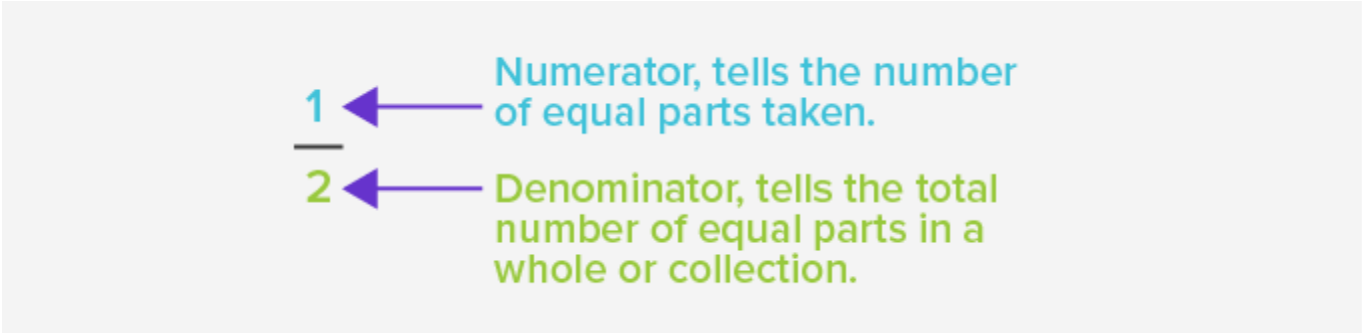
FRACTION

- ***A fraction is a part of a group or a region .***
- ***Fractions represent equal parts of a whole or a collection.***
- ***Fraction of a whole: When we divide a whole into equal parts, each part is a fraction of the whole.***



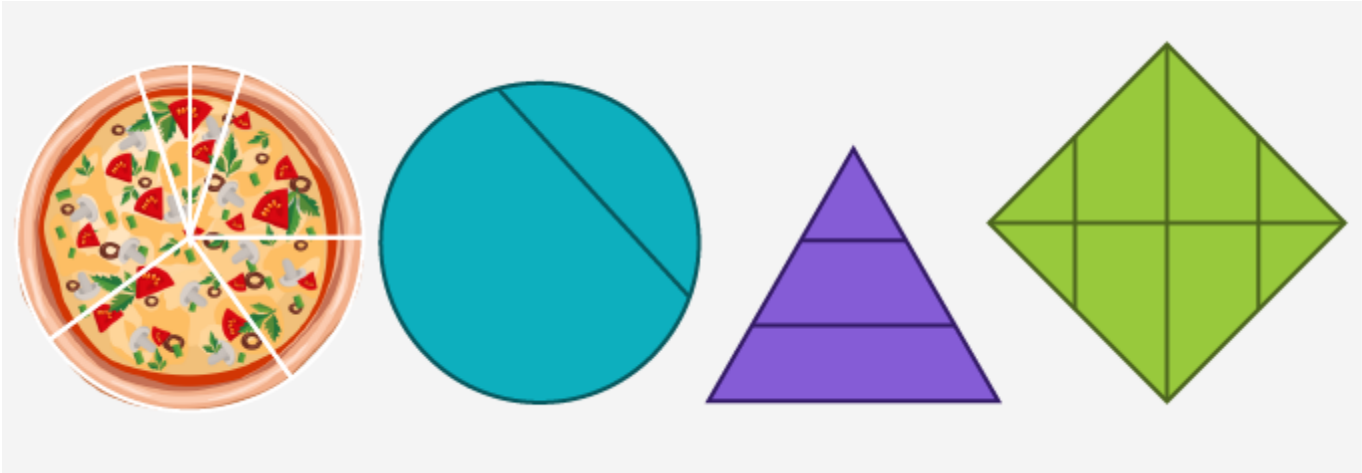
FRACTION NOTATION

- ***A fraction has two parts. The number on the top of the line is called the numerator. It tells how many equal parts of the whole or collection are taken. The number below the line is called the denominator. It shows the total divisible number of equal parts the whole into or the total number of equal parts which are there in a collection.***



Non-examples

- ***When the parts of the whole are unevenly divided, they don't form fractions.***



TYPES OF FRACTION

Proper Fractions

Numerator (top number) is smaller than Denominator (bottom number)

$\frac{1}{3}$ $\frac{5}{8}$

Improper Fractions

Numerator is larger than Denominator

$\frac{7}{3}$ $\frac{4}{3}$

Mixed Numbers

Whole number and a fraction

$3\frac{5}{7}$ $2\frac{4}{9}$

Converting Improper Fraction into Mixed Fraction

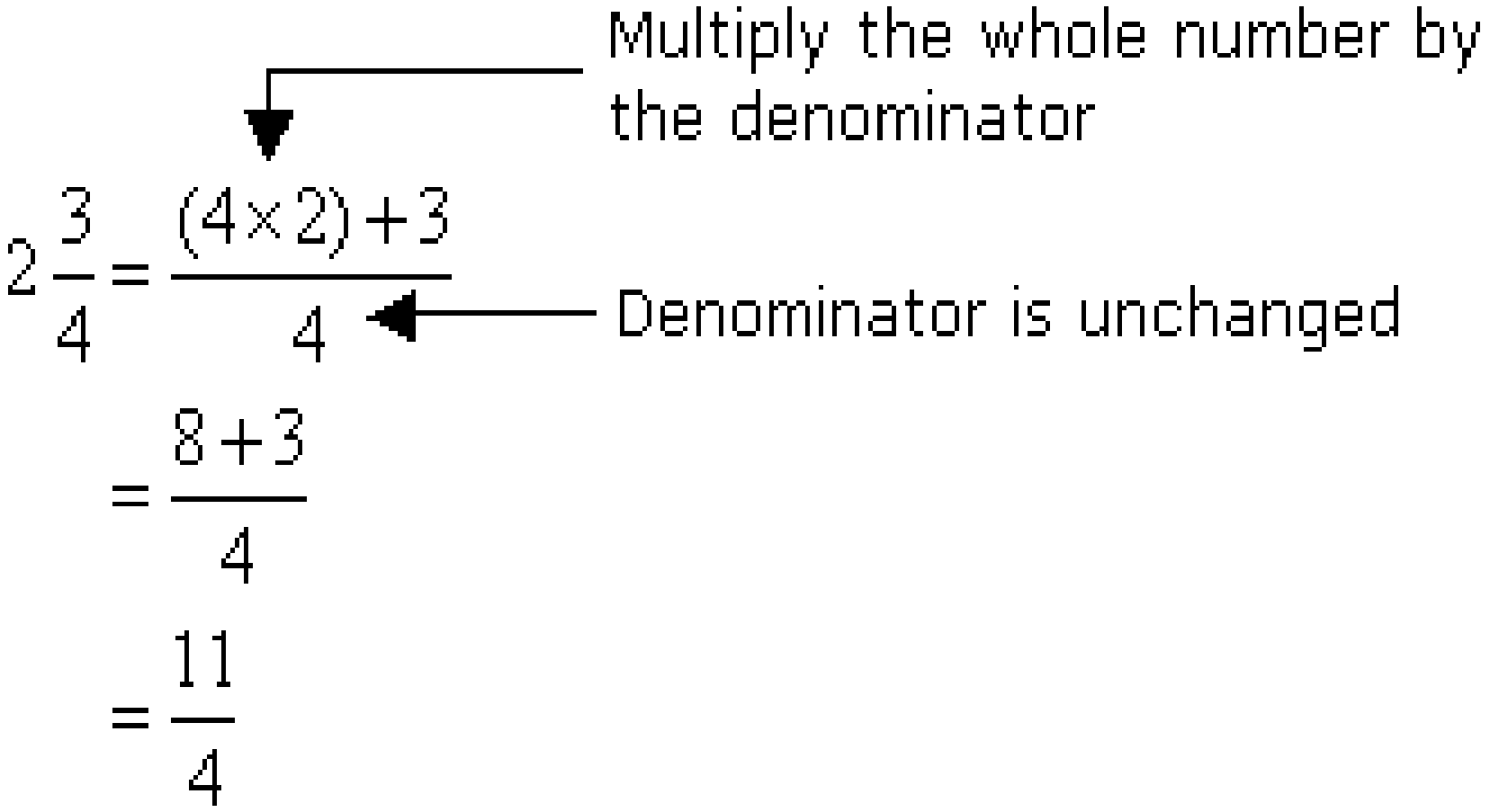
$$\frac{7}{3} = 2\frac{1}{3}$$

Step 1: Set-up a division problem and divide 7 by 3

$$\begin{array}{r} 2 \\ 3\overline{)\,7} \\ -6 \\ \hline 1 \end{array}$$

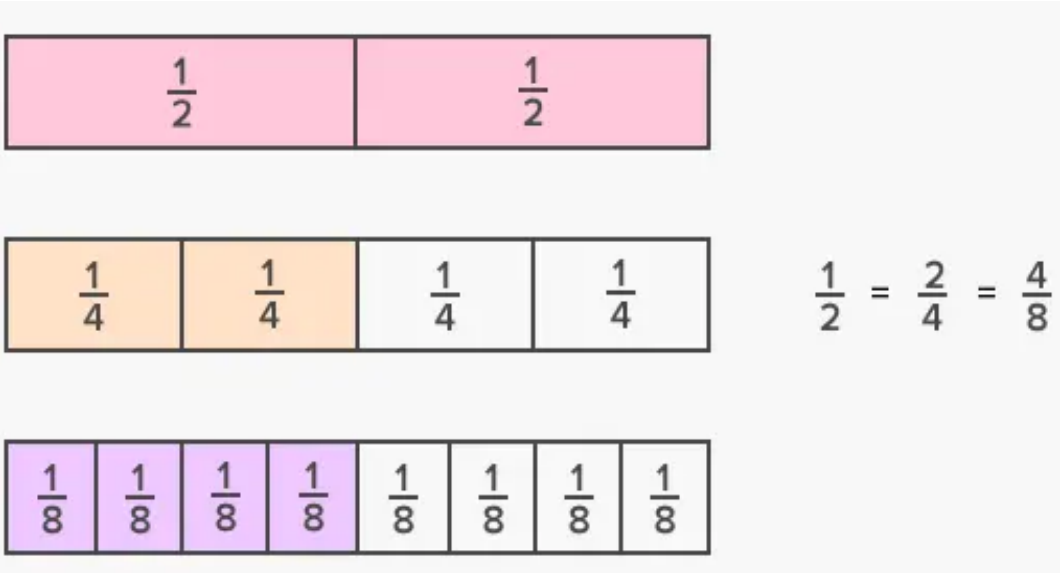
Step 2: the result is 2 with a remainder of 1 which we write as $2\frac{1}{3}$

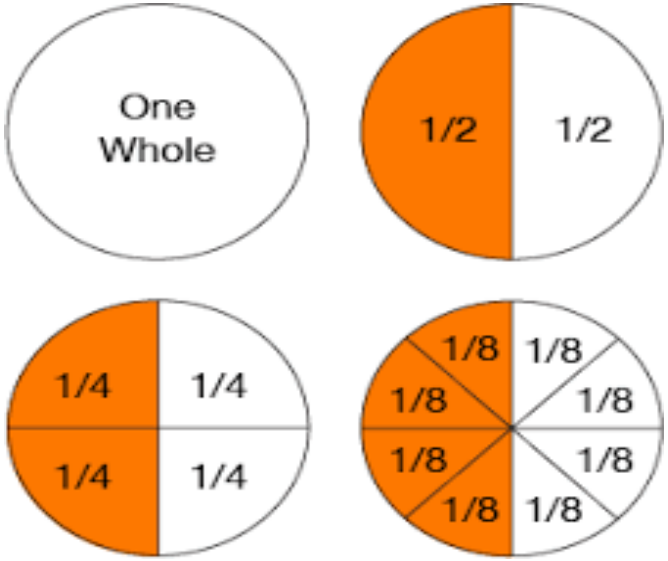
Converting Mixed Fraction into Improper Fraction

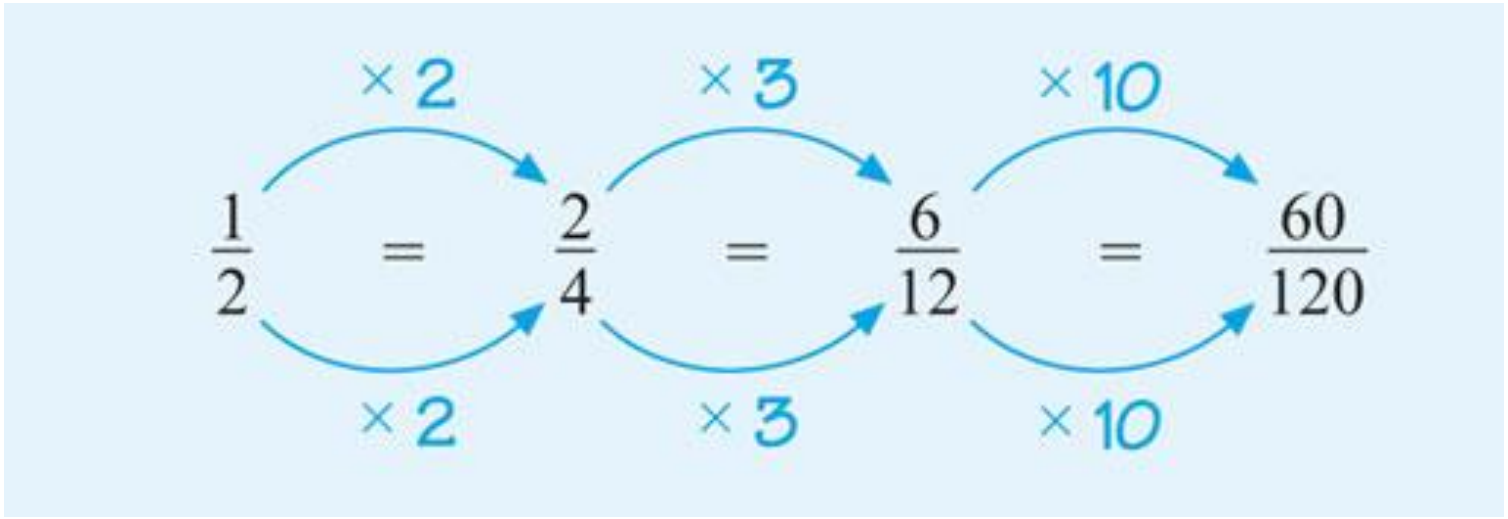


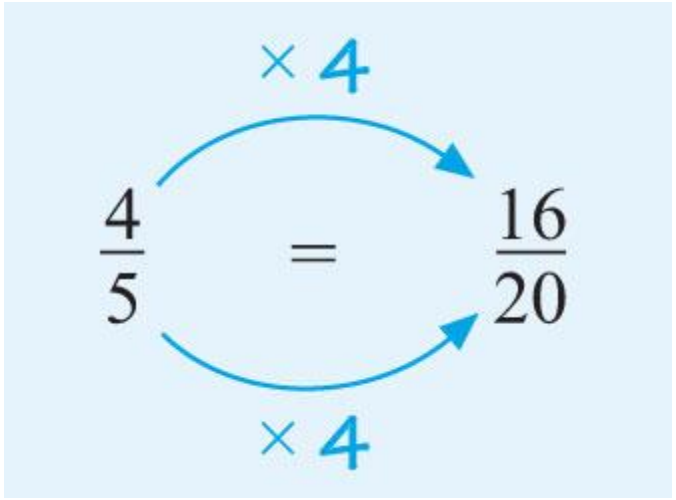
EQUIVALENT FRACTIONS

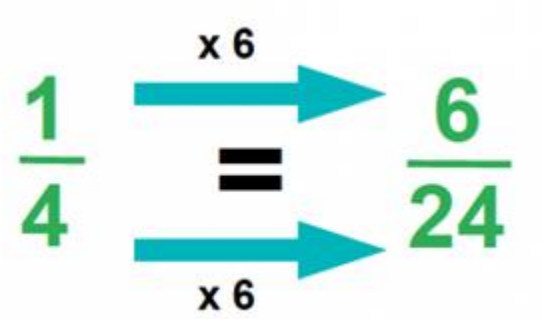
equivalent fractions can be defined as fractions with different numerators and denominators that represent the same value or proportion of the whole.






×2
×3
×10
1/2 = 2/4 = 6/12 = 60/120
×2
×3
×10


×4
4/5 = 16/20
×4


x 6
1/4 = 6/24
x 6

ADDING FRACTIONS

Adding Fractions with Like Denominators

$$\frac{1}{7}+\frac{3}{7}$$

Add the numerators.
Denominator is unchanged.

$$\frac{1+3}{7}$$

$$\frac{4}{7}$$

Adding Fractions with Unlike Denominators

$$\frac{1}{8}+\frac{2}{3}$$

Rewrite with common denominator

$$\frac{3\times 1}{3\times 8}+\frac{2\times 8}{3\times 8}$$

Add the numerators

$$\frac{3}{24}+\frac{16}{24}$$

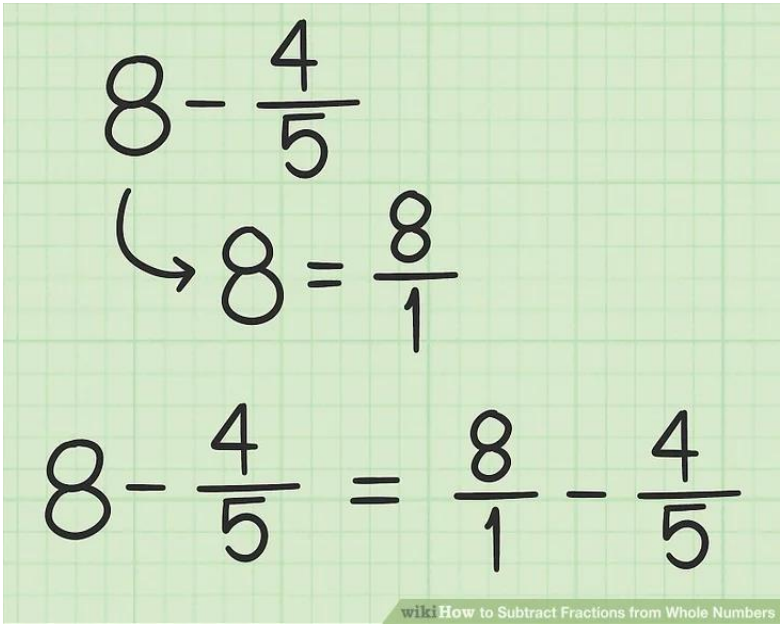
$$\frac{19}{24}$$

SUBTRACTING FRACTIONS

$$\frac{3}{4} - \frac{1}{3} = \frac{3 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4}$$

$$= \frac{9}{12} - \frac{4}{12}$$

$$= \frac{5}{12}$$



EXERCISE 2.1

Q1 Solve:

(i) $2-\frac{3}{5}$ (ii) $4+\frac{7}{8}$ (iii) $\frac{3}{5}+\frac{2}{7}$ (iv) $\frac{9}{11}-\frac{4}{15}$

(v) $\frac{7}{10}+\frac{2}{5}+\frac{3}{2}$ (vi) $2\frac{2}{3}+3\frac{1}{2}$ (vii) $8\frac{1}{2}-3\frac{5}{8}$

Solution:-

i) For subtraction of two unlike fractions, first change them to the like fractions.

LCM of 1, 5 = 5

Now, let us change each of the given fraction into an equivalent fraction having 5 as the denominator.

$$(i)\ 2-\frac{3}{5}=\frac{2}{1}-\frac{3}{5}=\frac{2\times5-3\times1}{1\times5}$$

$$=\frac{10-3}{5}=\frac{7}{5}=1\frac{2}{5}$$

$$5\overline{)\,7\,(1}$$
$$\underline{-5}$$
$$2$$

Hence, $2-\frac{3}{5}=1\frac{2}{5}$

(*iii*) $\frac{3}{5} + \frac{2}{7}$

LCM of 5 and 7 is 35.

$$= \frac{3 \times 7 + 2 \times 5}{5 \times 7}$$

$$= \frac{21 + 10}{35} = \frac{31}{35}$$

Hence, $\frac{3}{5} + \frac{2}{7} = \frac{31}{35}$

(H.W- Q1. ii), iv), vii)

$$(vi)\ 2\frac{2}{3} + 3\frac{1}{2} = \frac{8}{3} + \frac{7}{2}$$

- LCM of 3 and 2 is 6

$$= \frac{8 \times 2 + 3 \times 7}{3 \times 2}$$

$$= \frac{16 + 21}{6}$$

$$= \frac{37}{6}$$

$$= 6\frac{1}{6}$$

$$6\overline{)37}\,(6$$
$$\underline{36}$$
$$1$$

Hence, $2\frac{2}{3} + 3\frac{1}{2} = 6\frac{1}{6}$

Q2. Arrange the following in descending order:

(i) $\frac{2}{9}, \frac{2}{3}, \frac{8}{21}$ (ii) $\frac{1}{5}, \frac{3}{7}, \frac{7}{10}$

(*i*) $\frac{2}{9}, \frac{2}{3}, \frac{8}{21}$

LCM of 9, 3 and 21 = 3 × 3 × 7 = 63

Making the denominator same, we have

$$\frac{2}{9} \times \frac{7}{7} = \frac{14}{63}, \frac{2}{3} \times \frac{21}{21} = \frac{42}{63}$$

and $\frac{8}{21} \times \frac{3}{3} = \frac{24}{63}$

Since 42 > 24 > 14

Thus $\frac{42}{63} > \frac{24}{63} > \frac{14}{63}$

Hence, $\frac{2}{3} > \frac{8}{21} > \frac{2}{9}$

3	9, 3, 21
3	3, 1, 7
7	1, 1, 7
	1, 1, 1

(H.W- Q2. ii)

Q4. A rectangular sheet of paper is $12\frac{1}{2}$ cm long and $10\frac{2}{3}$ cm wide. Find its perimeter.

Solution:-

$$\text{Length of sheet} = 12\frac{1}{2}\text{ cm} = \frac{25}{2}\text{ cm}$$

$$\text{Breadth of the sheet} = 10\frac{2}{3} = \frac{32}{3}\text{ cm}$$

$$\text{Perimeter} = 2 \times [\text{length} + \text{breadth}]$$

$$= 2 \times \left[\frac{25}{2} + \frac{32}{3}\right]\text{ cm}$$

$$= 2 \times \left[\frac{25 \times 3 + 32 \times 2}{2 \times 3}\right]\text{ cm}$$

$$= 2 \times \left[\frac{75 + 64}{6}\right]\text{cm}$$

[LCM of 2 and 3 = 6]

$$= {}^{1}\cancel{2} \times \frac{139}{\cancel{6}_{3}} = \frac{139}{3}$$

$$= 46\frac{1}{3}\text{ cm}$$

$$\begin{array}{r|l} 3 & 139 \\ & \underline{-12} \\ & 19 \\ & \underline{-18} \\ & 1 \end{array}$$ (46)

Hence, the required perimeter = $46\frac{1}{3}$ cm.

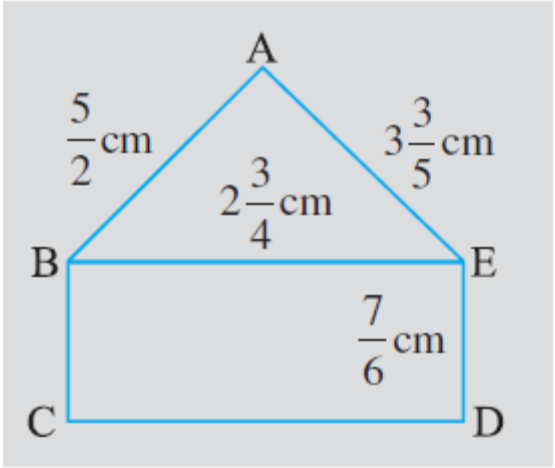
Q5 Find the perimeters of

(i) **Triangle ABE**

(ii) **The rectangle BCDE in this figure.**

(iii) **Whose perimeter is greater?**

(H.W- Q5)



Q6. Salil wants to put a picture in a frame. The picture is $7\frac{3}{5}$ cm wide. To fit in the frame the picture cannot be more than $7\frac{3}{10}$ cm wide. How much should the picture be trimmed?

Solution:-

The width of the picture

$$= 7\frac{3}{5} \text{ cm} = \frac{38}{5} \text{ cm}$$

The required width of the frame

$$= 7\frac{3}{10} \text{ cm} = \frac{73}{10} \text{ cm}$$

$\therefore$ The width of the picture to be trimmed of

$$= \frac{38}{5} \text{ cm} - \frac{73}{10} \text{ cm}$$

$$= \left(\frac{38}{5} - \frac{73}{10}\right) \text{cm} \qquad [\text{LCM of 5 and 10} = 10]$$

$$= \left(\frac{2 \times 38 - 73 \times 1}{10}\right) \text{cm}$$

$$= \left(\frac{76 - 73}{10}\right) \text{cm} = \frac{3}{10} \text{ cm}$$

Hence, the required width to be trimmed $= \frac{3}{10}$ cm.

Q7. Ritu ate (3/5) part of an apple and the remaining apple was eaten by her brother Somu. How much part of the apple did Somu eat? Who had the larger share? By how much?

Solution:-

Let the whole part of the apple be 1.

$$\text{Part of the apple eaten by Ritu} = \frac{3}{5}$$

$$\therefore \text{Part of the apple eaten by her brother Somu}$$

$$= 1 - \frac{3}{5}$$

$$= \frac{1}{1} - \frac{3}{5} = \frac{1 \times 5 - 3 \times 1}{5}$$

$$= \frac{5-3}{5} = \frac{2}{5} \qquad \text{Since } \frac{3}{5} > \frac{2}{5}$$

Thus, the share of Ritu was larger.

Difference between the two parts

$$= \frac{3}{5} - \frac{2}{5} = \frac{1}{5} \text{ part.}$$

Q8. Michael finished colouring a picture in (7/12) hour. Vaibhav finished colouring the same picture in (3/4) hour. Who worked longer? By what fraction was it longer?

(H.W Q8)

MULTIPLICATION OF FRACTIONS

Multiply the numerators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{}$$

Multiply the denominators

$$\frac{2}{5} \times \frac{3}{4} = \frac{6}{20}$$

Reduce the fraction if necessary

$$\frac{6}{20} = \frac{3}{10}$$

The three steps of multiplying fractions

Solve: $\frac{2}{6} \times \frac{9}{16}$

Step 1. Multiply the top numbers:

$$\frac{2}{6} \times \frac{9}{16} = \frac{2 \times 9}{} = \frac{18}{}$$

Step 2. Multiply the bottom numbers:

$$\frac{2}{6} \times \frac{9}{16} = \frac{2 \times 9}{6 \times 16} = \frac{18}{96}$$

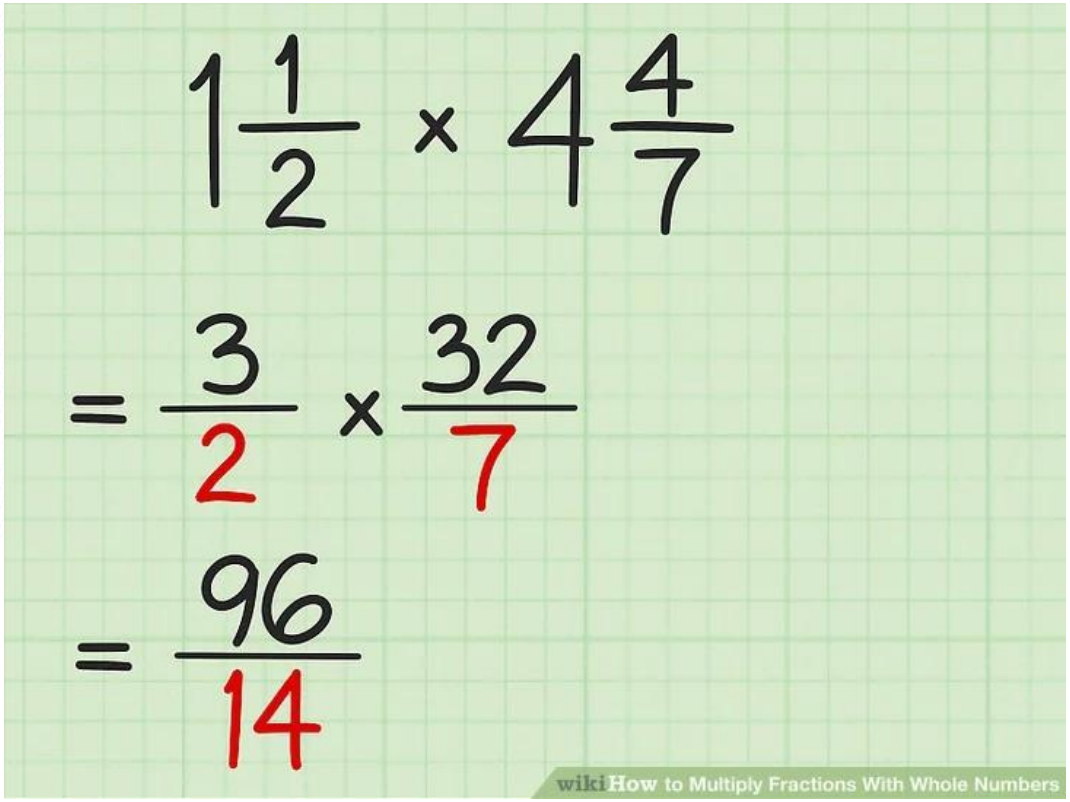
Step 3. Simplify the fraction:

$$\frac{18}{96} = \boxed{\frac{6}{32}}\ \text{Divided by 3} = \boxed{\frac{3}{16}}\ \text{Divided by 2}$$

MULTIPLICATION OF FRACTIONS

$$\frac{2}{5} \times \frac{6}{7} = \frac{2 \times 6}{5 \times 7} = \frac{12}{35}$$

$$\frac{1}{4} \times \frac{2}{3} = \frac{1 \times 2}{4 \times 3} = \frac{2}{12} = \text{reduces to } \frac{1}{6}$$



Common error when multiplying a fraction by a whole number

Multiplying both numerator and denominator by the number

Doing this

$$\frac{3}{4} \times 5 = \frac{15}{20}$$

Instead of this

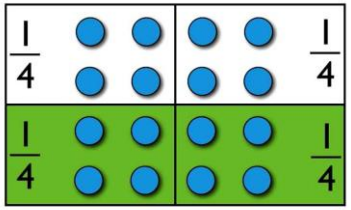
$$\frac{3}{4} \times \frac{5}{1} = \frac{15}{4} = 3\frac{3}{4}$$

Writing the whole number as a fraction helps

$\frac{3}{5}$ths of 25

$$\frac{3}{5} \times 25 = 15$$

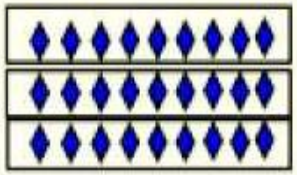
Fraction Number



$\frac{2}{4}$ of 16 = 8

So now let's look at

$\frac{2}{3}$ of 27



EXERCISE 2.2

Q1. Which of the drawings (a) to (d) show :

(i) $2 \times \frac{1}{5}$ (ii) $2 \times \frac{1}{2}$ (iii) $3 \times \frac{2}{3}$ (iv) $3 \times \frac{1}{4}$

(a) 

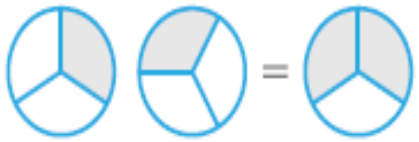
(b) 

(c) 

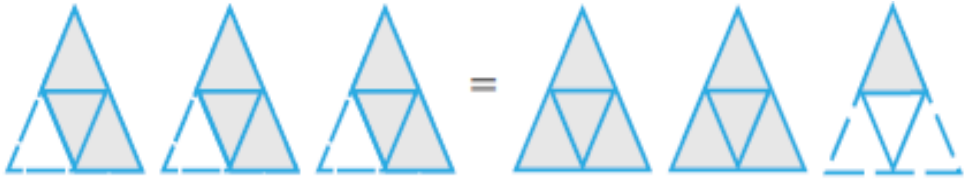
(d) 

Q2. Some pictures (a) to (c) are given below. Tell which of them show:

(i) $3 \times \frac{1}{5} = \frac{3}{5}$ (ii) $2 \times \frac{1}{3} = \frac{2}{3}$ (iii) $3 \times \frac{3}{4} = 2\frac{1}{4}$



(a)



(b)

(c)

Q3. Multiply and reduce to lowest form:

(i) $7 \times \frac{3}{5}$ (ii) $4 \times \frac{1}{3}$ (iii) $2 \times \frac{6}{7}$ (iv) $5 \times \frac{2}{9}$ (v) $\frac{2}{3} \times 4$

(vi) $\frac{5}{2} \times 6$ (vii) $11 \times \frac{4}{7}$ (viii) $20 \times \frac{4}{5}$ (ix) $13 \times \frac{1}{3}$ (x) $15 \times \frac{3}{5}$

Solution:-

(*i*) $7 \times \frac{3}{5} = \frac{21}{5}$

$= 4\frac{1}{5}$

$5\overline{)21}(4$
-20
1

(*ii*) $4 \times \frac{1}{3} = \frac{4}{3}$

$= 1\frac{1}{3}$

$3\overline{)4}(1$
-3
1

(H,W- Q3. iii,ix, x)

$$(viii)\ 20 \times \frac{4}{5} = \frac{\cancel{80}^{16}}{\cancel{5}}$$

$$= 16$$

$$(ix)\ 13 \times \frac{1}{3} = \frac{13}{3}$$

$$= 4\frac{1}{3}$$

$$\begin{array}{r} 4 \\ 3\overline{)\ 13} \\ -12 \\ \hline 1 \end{array}$$

Q5. Find (a) $\frac{1}{2}$ of (i) 24 (ii) 46 (b) $\frac{2}{3}$ of (i) 18 (ii) 27

(c) $\frac{3}{4}$ of (i) 16 (ii) 36 (d) $\frac{4}{5}$ of (i) 20 (ii) 35

Solution:-

$$(a)\ (i)\ \frac{1}{2}\text{ of } 24 = \frac{1}{\cancel{2}} \times \cancel{24}^{12}$$

$$= 12$$

$$(ii)\ \frac{1}{2}\text{ of } 46 = \frac{1}{\cancel{2}} \times \cancel{46}^{23}$$

$$= 23$$

(H.W- Q5. b and d)

$$(c)\ (i)\ \frac{3}{4}\ \text{of}\ 16 \qquad = \frac{3}{\cancel{4}} \times \cancel{16}^{4}$$

$$= 12$$

$$(ii)\ \frac{3}{4}\ \text{of}\ 36 \qquad = \frac{3}{\cancel{4}} \times \cancel{36}^{9}$$

$$= 27$$

Q6. Multiply and express as a mixed fraction :

(a) $3\times5\frac{1}{5}$ (b) $5\times6\frac{3}{4}$ (c) $7\times2\frac{1}{4}$

(d) $4\times6\frac{1}{3}$ (e) $3\frac{1}{4}\times6$ (f) $3\frac{2}{5}\times8$

Solution:-

(a) $3\times5\frac{1}{5} = 3\times\frac{26}{5}$

$= \frac{78}{5}$

$= 15\frac{3}{5}$

$5\overline{)78}\,(15$
-5
28
-25
3

(f) $3\frac{2}{5}\times8 = \frac{17}{5}\times8$

$= \frac{136}{5}$

$= 27\frac{1}{5}$

$5\overline{)136}\,(27$
-10
36
-35
1

(H.W- Q6. c,e)

Q7. Find:

(a) $\frac{1}{2}$ of (i) $2\frac{3}{4}$ (ii) $4\frac{2}{9}$ (b) $\frac{5}{8}$ of (i) $3\frac{5}{6}$ (ii) $9\frac{2}{3}$

Solution:-

$$(a)\,(i)\ \frac{1}{2}\ \text{of}\ 2\frac{3}{4} = \frac{1}{2}\times\frac{11}{4} = \frac{11}{8}$$

$$= 1\frac{3}{8}$$

$$(ii)\ \frac{1}{2}\ \text{of}\ 4\frac{2}{9} = \frac{1}{\cancel{2}}\times\frac{\cancel{38}^{19}}{9} = \frac{19}{9}$$

$$= 2\frac{1}{9}$$

(H.W- Q7. b)

Q8. Vidya and Pratap went for a picnic. Their mother gave them a water bag that contained 5 litres of water. Vidya consumed $\frac{2}{5}$ of the water. Pratap consumed the remaining water.

(i) How much water did Vidya drink?

(ii) What fraction of the total quantity of water did Pratap drink?

Solution:- (i) Water consumed by Vidya $= \frac{2}{5}$ of 5 litres

$$= \frac{2}{\cancel{5}} \times \cancel{5} \text{ litres} = 2 \text{ litres}$$

Water consumed by Patap = 5 litres – 2 litres = 3 litres

(ii) Fraction of water consumed by Pratap $= \frac{3}{5}$ litres

EXERCISE 2.3

Q1. Find: (i) $\frac{1}{4}$ of (a) $\frac{1}{4}$ (b) $\frac{3}{5}$ (c) $\frac{4}{3}$

(ii) $\frac{1}{7}$ of (a) $\frac{2}{9}$ (b) $\frac{6}{5}$ (c) $\frac{3}{10}$

Solution:-

$(i)\,(a)\ \frac{1}{4}\ \text{of}\ \frac{1}{4} = \frac{1}{4}\times\frac{1}{4}$

$= \frac{1\times 1}{4\times 4} = \frac{1}{16}$

$(b)\ \frac{1}{4}\ \text{of}\ \frac{3}{5} = \frac{1}{4}\times\frac{3}{5}$

$= \frac{1\times 3}{4\times 5} = \frac{3}{20}$

$(c)\ \frac{1}{4}\ \text{of}\ \frac{4}{3} = \frac{1}{\cancel{4}}\times\frac{\cancel{4}}{3} = \frac{1}{3}$

(H.W- Q1. b)

Q2. Multiply and reduce to lowest form (if possible) :

(i) $\frac{2}{3} \times 2\frac{2}{3}$ (ii) $\frac{2}{7} \times \frac{7}{9}$ (iii) $\frac{3}{8} \times \frac{6}{4}$ (iv) $\frac{9}{5} \times \frac{3}{5}$

(v) $\frac{1}{3} \times \frac{15}{8}$ (vi) $\frac{11}{2} \times \frac{3}{10}$ (vii) $\frac{4}{5} \times \frac{12}{7}$

Solution:-

$$(i)\ \frac{2}{3} \times 2\frac{2}{3} = \frac{2}{3} \times \frac{8}{3} = \frac{2 \times 8}{3 \times 3}$$

$$= \frac{16}{9}$$

$$= 1\frac{7}{9}$$

$$9\overline{)16}\,(1$$
$$-9$$
$$\overline{7}$$

$$(ii)\ \frac{2}{7} \times \frac{7}{9} = \frac{2 \times 7}{7 \times 9} = \frac{14}{63}$$

$$= \frac{14 \div 7}{63 \div 7} = \frac{2}{9}$$

(H.W-Q2. iv,v)

(vi) $\frac{11}{2} \times \frac{3}{10} = \frac{11 \times 3}{2 \times 10} = \frac{33}{20}$

$= 1\frac{13}{20}$

$$\begin{array}{r|l} 20 & 33 \ (1 \\ -20 & \\ \hline 13 & \end{array}$$

(vii) $\frac{4}{5} \times \frac{12}{7} = \frac{4 \times 12}{5 \times 7} = \frac{48}{35}$

$= 1\frac{13}{35}$

$$\begin{array}{r|l} 35 & 48 \ (1 \\ -35 & \\ \hline 13 & \end{array}$$

Q3. For the fractions given below :

(a) Multiply and reduce the product to lowest form (if possible)

(b) Tell whether the fraction obtained is proper or improper.

(c) If the fraction obtained is improper then convert it into a mixed fraction.

(i) $\frac{2}{5}\times 5\frac{1}{4}$ (ii) $6\frac{2}{5}\times\frac{7}{9}$ (iii) $\frac{3}{2}\times 5\frac{1}{3}$ (iv) $\frac{5}{6}\times 2\frac{3}{7}$

(v) $3\frac{2}{5}\times\frac{4}{7}$ (vi) $2\frac{3}{5}\times 3$ (vii) $3\frac{4}{7}\times\frac{3}{5}$

Solution:-

$$(i)\ \frac{2}{5}\times 5\frac{1}{4} = \frac{\cancel{2}}{5}\times\frac{21}{\cancel{4}_2}$$

$$= \frac{1\times 21}{5\times 2}$$

$$= \frac{21}{10} = 2\frac{1}{10}$$

$$10\overline{)\,21\,(2}$$
$$\underline{-20}$$
$$1$$

(ii) $6\frac{2}{5} \times \frac{7}{9}$ $= \frac{32}{5} \times \frac{7}{9} = \frac{32 \times 7}{5 \times 9}$

$= \frac{224}{45}$

$= 4\frac{44}{45}$

$$\begin{array}{r|l} 45 & 224 \\ -180 & 4 \\ \hline 44 & \end{array}$$

Q4. Which is greater :

(i) $\frac{2}{7}$ of $\frac{3}{4}$ or $\frac{3}{5}$ of $\frac{5}{8}$ (ii) $\frac{1}{2}$ of $\frac{6}{7}$ or $\frac{2}{3}$ of $\frac{3}{7}$

Solution:-

$$(i)\ \frac{2}{7} \text{ of } \frac{3}{4} = \frac{\cancel{2}}{7} \times \frac{3}{\cancel{4}_2}$$

$$= \frac{1 \times 3}{7 \times 2} = \frac{3}{14}$$

$$\frac{3}{5} \text{ of } \frac{5}{8} = \frac{3}{\cancel{5}} \times \frac{\cancel{5}}{8} = \frac{3}{8}$$

Since in $\frac{3}{14}$ and $\frac{3}{8}$, their numerators are same and $14 > 8$.

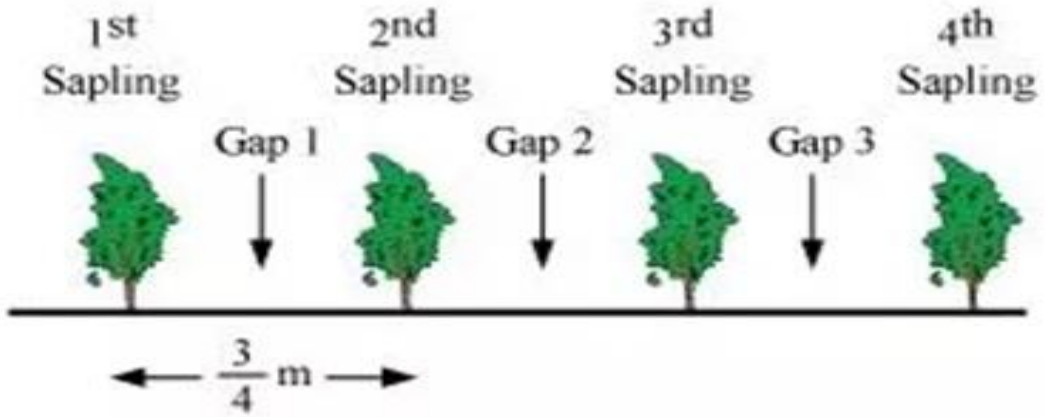
$$\therefore \quad \frac{3}{14} < \frac{3}{8} \text{ or } \frac{3}{8} > \frac{3}{14}$$

Hence, $\frac{3}{5}$ of $\frac{5}{8} > \frac{2}{7}$ of $\frac{3}{4}$

(H.W- Q4. b)

Q5. Saili plants 4 saplings, in a row, in her garden. The distance between two adjacent saplings is $\frac{3}{4}$ m. Find the distance between the first and the last sapling.

Solution:-



From the figure, it can be observed that gaps between 1st and last sapling = 3

$$\text{Length of 1 gap} = \frac{3}{4}\text{ m}$$

$$\text{Therefore, distance between I and IV sapling} = 3 \times \frac{3}{4}$$

$$= \frac{9}{4} = 2\frac{1}{4}\text{ m}$$

Q6 Lipika reads a book for $1\frac{3}{4}$ hours every day. She reads the entire book in 6 days.

How many hours in all were required by her to read the book?

Solution:- Number of hours Lipika reads the book per day $= 1\frac{3}{4}$

$$= \frac{7}{4} \text{ hours}$$

Number of days = 6

Total number of hours required by her to read the book $= \frac{7}{4} \times 6$

$$= \frac{21}{2}$$

$$= 10\frac{1}{2} \text{ hours}$$

Q7. A car runs 16 km using 1 litre of petrol. How much distance will it cover using $2\frac{3}{4}$ litres of petrol.

Q8.

(a) (i) Provide the number in the box $\square$, such that $\frac{2}{3}\times\square=\frac{10}{30}$.

(ii) The simplest form of the number obtained in $\square$ is .

(b) (i) Provide the number in the box $\square$, such that $\frac{3}{5}\times\square=\frac{24}{75}$?

(ii) The simplest form of the number obtained in $\square$ is .

(H.W-Q7)

DIVISIONS OF FRACTIONS

Invert the fraction that you are dividing by

$$\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2}$$

Multiply the numerators and denominators

$$\frac{4}{5} \times \frac{3}{2} = \frac{12}{10}$$

Simplify the fraction if necessary

$$\frac{12}{10} = 1\frac{1}{5}$$

$$\frac{2}{3} \div \frac{4}{5} = \frac{2}{3} \times \frac{5}{4}$$

$$= \frac{2 \times 5}{3 \times 4}$$

$$= \frac{10}{12}$$

$$= \frac{5}{6}$$

$$5 \div \frac{30}{36} = \frac{5}{1} \div \frac{30}{36}$$

$$= \frac{\overset{1}{\cancel{5}}}{1} \times \frac{36}{\underset{6}{\cancel{30}}}$$

$$= \frac{\overset{6}{\cancel{36}}}{\underset{1}{\cancel{6}}} = 6$$

Dividing Mixed Numbers

1. Convert all mixed numbers to improper fractions.

$$2\frac{1}{3} \div 3\frac{2}{5} = \frac{7}{3} \div \frac{17}{5}$$

2. Change ÷ to ×
3. **Flip** the divisor.
4. Multiply.
5. Simplify.

$$= \frac{7}{3} \times \frac{5}{17}$$

$$= \frac{35}{51}$$

EXERCISE 2.4

Q1. Find:

(i) $12 \div \frac{3}{4}$ (ii) $14 \div \frac{5}{6}$ (iii) $8 \div \frac{7}{3}$ (iv) $4 \div \frac{8}{3}$

(v) $3 \div 2\frac{1}{3}$ (vi) $5 \div 3\frac{4}{7}$

Solution:-

$(i)\ 12 \div \frac{3}{4} = \cancel{12}^{4} \times \frac{4}{\cancel{3}}$

$= 4 \times 4 = 16$

$(ii)\ 14 \div \frac{5}{6} = 14 \times \frac{6}{5}$

$= \frac{84}{5}$

$= 16\frac{4}{5}$

$$\begin{array}{r|l} 5 & 84\ (16 \\ -5 & \\ \hline 34 & \\ -30 & \\ \hline 4 & \end{array}$$

(vi) $5 \div 3\frac{4}{7}$ $= 5 \div \frac{25}{7}$

$= \cancel{5}^{1} \times \frac{7}{\cancel{25}_{5}}$

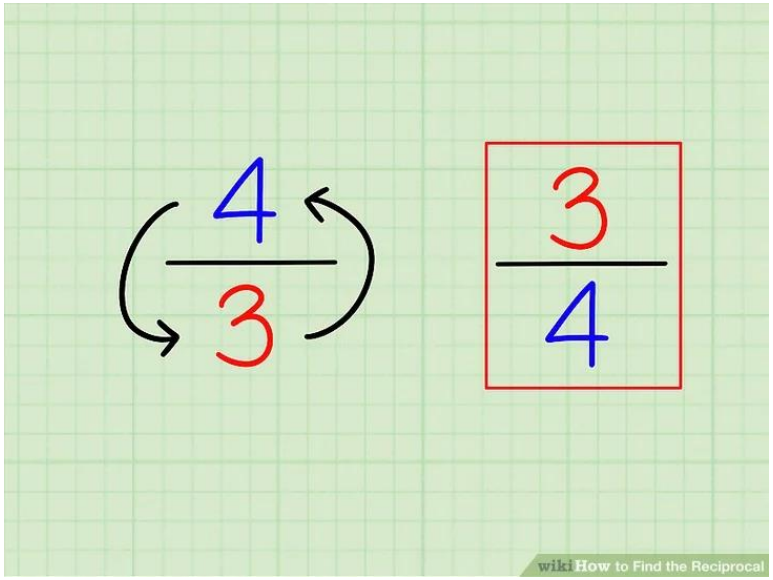
$= \frac{7}{5}$

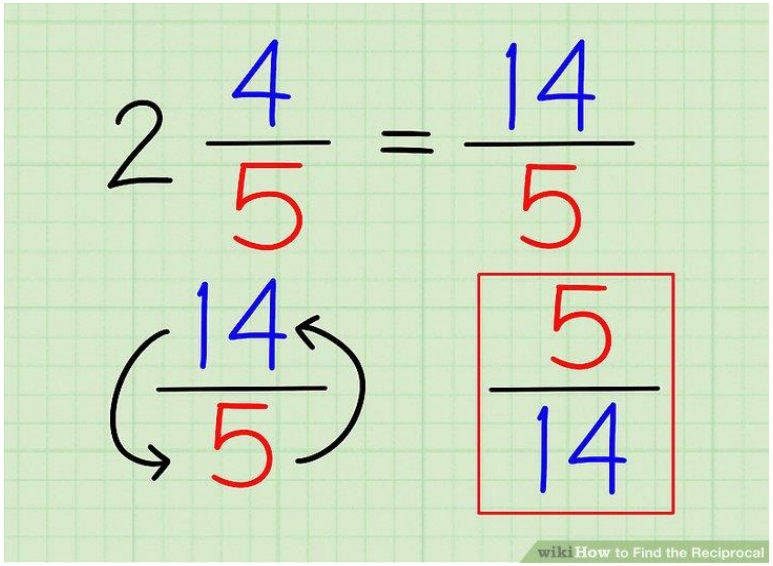
$= 1\frac{2}{5}$

$$\begin{array}{r} 5\overline{)\,7\,(1} \\ -\underline{5} \\ \underline{2} \end{array}$$

RECIPROCAL OF A FRACTION

The non-zero numbers whose product with each other is 1, are called the reciprocals of each other.





Q2. Find the reciprocal of each of the following fractions. Classify the reciprocals as proper fractions, improper fractions and whole numbers.

(i) $\frac{3}{7}$ (ii) $\frac{5}{8}$ (iii) $\frac{9}{7}$ (iv) $\frac{6}{5}$

(v) $\frac{12}{7}$ (vi) $\frac{1}{8}$ (vii) $\frac{1}{11}$

Solution:-

(i) Reciprocal of $\frac{3}{7} = \frac{7}{3}$, which is improper fraction.

(ii) Reciprocal of $\frac{5}{8} = \frac{8}{5}$, which is improper fraction.

(iii) Reciprocal of $\frac{9}{7} = \frac{7}{9}$, which is proper fraction.

(iv) Reciprocal of $\frac{6}{5} = \frac{5}{6}$, which is proper fraction.

(vi) Reciprocal of $\frac{12}{7} = \frac{7}{12}$, which is proper fraction.

(vi) Reciprocal of $\frac{1}{8} = 8$, which is whole number.

(vii) Reciprocal of $\frac{1}{11} = 11$, which is whole number.

Q3. Find:

(i) $\frac{7}{3} \div 2$ (ii) $\frac{4}{9} \div 5$ (iii) $\frac{6}{13} \div 7$ (iv) $4\frac{1}{3} \div 3$

(v) $3\frac{1}{2} \div 4$ (vi) $4\frac{3}{7} \div 7$

Solution:-

$$(i)\ \frac{7}{3} \div 2 = \frac{7}{3} \times \frac{1}{2} = \frac{7}{6}$$

$$= 1\frac{1}{6}$$

$$6\overline{)7}\,(1$$
$$-6$$
$$\overline{1}$$

$$(ii)\ \frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$$

(iv) $4\frac{1}{3} \div 3 = \frac{13}{3} \div 3$

$= \frac{13}{3} \times \frac{1}{3}$

$= \frac{13}{9}$

$= 1\frac{4}{9}$

$$\begin{array}{r} 1 \\ 9\overline{)\,13} \\ -\,9 \\ \hline 4 \end{array}$$

Q4. Find:

(i) $\frac{2}{5} \div \frac{1}{2}$ (ii) $\frac{4}{9} \div \frac{2}{3}$ (iii) $\frac{3}{7} \div \frac{8}{7}$ (iv) $2\frac{1}{3} \div \frac{3}{5}$ (v) $3\frac{1}{2} \div \frac{8}{3}$

(vi) $\frac{2}{5} \div 1\frac{1}{2}$ (vii) $3\frac{1}{5} \div 1\frac{2}{3}$ (viii) $2\frac{1}{5} \div 1\frac{1}{5}$

Solution:-

$$(i)\ \frac{2}{5} \div \frac{1}{2} = \frac{2}{5} \times \frac{2}{1} = \frac{4}{5}$$

$$(ii)\ \frac{4}{9} \div \frac{2}{3} = \frac{\cancel{4}^{2}}{\cancel{9}_{3}} \times \frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{2}}} = \frac{2}{3}$$

(vii) $3\frac{1}{5} \div 1\frac{2}{3} = \frac{16}{5} \div \frac{5}{3}$

$= \frac{16}{5} \times \frac{3}{5}$

$= \frac{48}{25}$

$= 1\frac{23}{25}$

$25\overline{)\,48\,(1}$
$\underline{-25}$
23

(viii) $2\frac{1}{5} \div 1\frac{1}{5} = \frac{11}{5} \div \frac{6}{5} = \frac{11}{\cancel{5}} \times \frac{\cancel{5}}{6}$

$= \frac{11}{6}$

$= 1\frac{5}{6}$

$6\overline{)\,11\,(1}$
$\underline{-6}$
5

EXERCISE 2.5

Q1. Which is greater?

(i) 0.5 or 0.05 (ii) 0.7 or 0.5 (iii) 7 or 0.7

(iv) 1.37 or 1.49 (v) 2.03 or 2.30 (vi) 0.8 or 0.88.

(i) 0.5 or 0.05

Solution:-

By comparing whole number, 0 = 0

By comparing the tenths place digit, 5 > 0

∴ 0.5 > 0.05

(iii) 7 or 0.7

Solution:-

By comparing whole number, 7 > 0

∴ 7 > 0.7

(v) 2.03 or 2.30

Solution:-

By comparing whole number, 2 = 2

By comparing the tenths place digit, 0 < 3

∴ 2.03 < 2.30

(vi) 0.8 or 0.88

0.80 or 0.88

Solution:-

By comparing whole number, 0 = 0

By comparing the tenths place digit, 8 = 8

By comparing the hundredths place digit, 0 < 8

∴ 0.8 < 0.88

CONVERSION SCALE

As 100 paise = Rs 1

1 paise = Rs $\frac{1}{100}$

Q2. Express as rupees using decimals :

(i) 7 paise (ii) 7 rupees 7 paise (iii) 77 rupees 77 paise (iv) 50 paise (v) 235 paise.

(i) 7 paise

Solution:-

We know that,

= Rs 1 = 100 paise

= 1 paise = Rs (1/100)

∴ 7 paise = Rs 7/100)

= Rs 0.07

(iii) 77 rupees 77 paise

Solution:-

We know that,

= Rs 1 = 100 paise

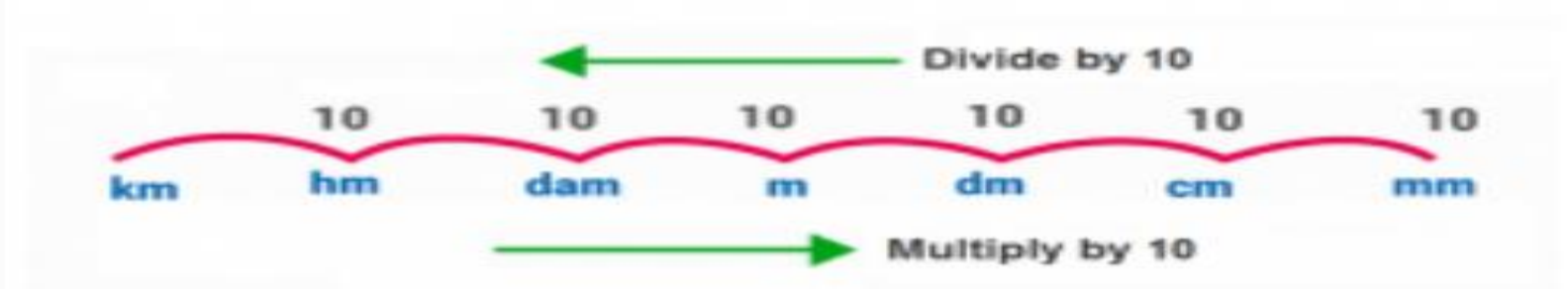
= 1 paise = Rs (1/100)

∴ 77 rupees 77 paise = Rs 77 + Rs (77/100)

= Rs 77 + Rs 0.77

= Rs 7.77

CONVERSION SCALE



MOVING TOWARDS RIGHT= MULTIPLY

MOVING TOWARDS LEFT = DIVIDE

Q3. (i) Express 5 cm in metre and kilometre

(ii) Express 35 mm in cm, m and km.

Solution:-

We know that,

= 1 meter = 100 cm

Then,

$$5 \text{ cm} = \frac{5}{100} \text{ m}$$

$$= 0.05 \text{ m}$$

Now,

= 1 km = 1000 m

$$5 \text{ cm} = \frac{5}{100000} \text{ km}$$

$$= 0.00005 \text{ km}$$

Q4. Express in kg:

(i) 200 g (ii) 3470 g (iii) 4 kg 8 g (iv) 2598 mg

(i)200 g

Solution:-

We know that,

1 kg = 1000 g

Then,

$$200\ \text{g} = \frac{200}{1000}\ \text{kg} = 0.2\ \text{kg}$$

200g= 0.2 kg

(iii) 4 kg 8 g

Since 1 kg =1000g

$$4\text{ kg }8\text{ g}$$

$$= 4\text{ kg} + \frac{8}{1000}\text{ kg}$$

= 4.008 kg

Q5. Write the following decimal numbers in the expanded form:

(i) 20.03 (ii) 2.03 (iii) 200.03 (iv) 2.034

Expanded Form:-

$$\text{(i) } 20.03 = 2\times 10 + 0\times 1 + 0\times\frac{1}{10} + 3\times\frac{1}{100}$$

$$\text{(ii) } 2.03 = 2\times 1 + 0\times\frac{1}{10} + 3\times\frac{1}{100}$$

$$\text{(iii) } 200.03 = 2\times 100 + 0\times 10 + 0\times 1 + 0\times\frac{1}{10} + 3\times\frac{1}{100}$$

$$\text{(iv) } 2.034 = 2\times 1 + 0\times\frac{1}{10} + 3\times\frac{1}{100} + 4\times\frac{1}{1000}$$

Q6. Write the place value of 2 in the following decimal numbers:
(i) 2.56 (ii) 21.37 (iii) 10.25 (iv) 9.42 (v) 63.352.

Solution:-

(i) 2.56

Solution:-

From the question, we observe that, The place value of 2 in 2.56 is ones

(ii) 21.37 Solution:-

From the question, we observe that, The place value of 2 in 21.37 is tens

10.25 Solution:-

From the question, we observe that,

The place value of 2 in 10.25 is tenths.

Q7. Dinesh went from place A to place B and from there to place C. A is 7.5 km from B and B is 12.7 km from C. Ayub went from place A to place D and from there to place C. D is 9.3 km from A and C is 11.8 km from D. Who travelled more and by how much?

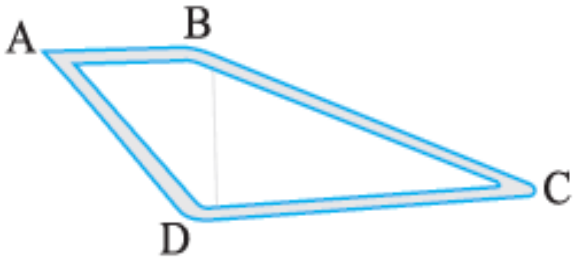
Solution:-

From the question, it is given that, Distance travelled by Dinesh

= AB + BC

= 7.5 + 12.7

= 20.2 km



∴Dinesh travelled 20.2 km

Distance travelled by Ayub

= AD + DC

= 9.3 + 11.8

= 21.1 km

∴Ayub travelled 21.1km

Clearly, Ayub travelled more distance by

= (21.1 – 20.2)

= 0.9 km

∴Ayub travelled 0.9 km more than Dinesh.

Q8. Shyama bought 5 kg 300 g apples and 3 kg 250 g mangoes. Sarala bought 4 kg 800 g oranges and 4 kg 150 g bananas. Who bought more fruits? (Home Work)

Q9. How much less is 28 km than 42.6 km?

Solution:-

Now, we have to find the difference of 42.6 km and 28 km 42.6

-28.0

14.6

∴ 14.6 km less is 28 km than 42.6 km.

Multiplying Decimals

1. Multiply like whole numbers.
2. Count decimal places in the problem.
3. Put the same number of places behind the decimal in the product.

$$\begin{array}{rl} 2.34 & \text{2 decimal places} \\ \times\ 1.2 & +\ \text{1 decimal place} \\ \hline 2.808 & \text{3 decimal places} \end{array}$$

3.77 x 2.8 = ?

$$\begin{array}{rl} 3.77 & \text{(2 decimal places)} \\ \times\ 2.8 & \text{(1 decimal place)} \\ \hline 3016 & \\ +754 & \\ \hline 10.556 & \text{(3 decimal places)} \end{array}$$

EXERCISE 2.6

Q1.Find:

(i) 0.2 × 6 (ii) 8 × 4.6 (iii) 2.71 × 5 (iv) 20.1 × 4

(v) 0.05 × 7 (vi) 211.02 × 4 (vii) 2 × 0.86

Solution:-

$$\text{(i) } 0.2 \times 6 = \frac{2}{10} \times 6 = \frac{12}{10}$$

$$= 1.2$$

$$\text{(iii) } 2.71 \times 5 = \frac{271}{100} \times 5 = \frac{1355}{100}$$

$$= 13.55$$

$$\text{(iv) } 20.1 \times 4 = \frac{201}{10} \times 4 = \frac{804}{10}$$

$$= 80.4$$

$$\text{(vi) } 211.02 \times 4 = \frac{21102}{100} \times 4 = \frac{84408}{100}$$

$$= 844.08$$

(H.W- Q1. ii, v,vii)

Q2. Find the area of rectangle whose length is 5.7cm and breadth is 3 cm.

Solution:-

From the question, it is given that, Length of the rectangle = 5.7 cm Breadth of the rectangle = 3 cm Then,

Area of the rectangle = length × Breadth

= 5.7 × 3

= 17.1 cm^2

MULTIPLYING DECIMALS BY 10, 100, 100.....

Basic facts and patterns of zeros can help you multiply decimals by 10, 100, and 1000

$2.38 \times 1 = 2.38$

$2.38 \times 10 = 23.8$

$2.38 \times 100 = 238.0$

$2.38 \times 1000 = 2380.0$

Try these

i) 0.7×10

ii) 1.3×100

iii) 76.3×1000

Q3.Find:

(i) 1.3 × 10 (ii) 36.8 × 10 (iii) 153.7 × 10 (iv) 168.07 × 10

(v) 31.1 × 100 (vi) 156.1 × 100 (vii) 3.62 × 100 (viii) 43.07 × 100

(ix) 0.5 × 10 (x) 0.08 × 10 (xi) 0.9 × 100 (xii) 0.03 × 1000

(i) 1.3 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place. We have,

= 1.3 × 10 = 13

(ii) 36.8 × 10

Solution:-

On multiplying a decimal by 10, the decimal point is shifted to the right by one place. We have,

= 36.8 × 10 = 368

(v) 31.1 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places. We have,

= 31.1 × 100 = 3110

(vi) 156.1 × 100

Solution:-

On multiplying a decimal by 100, the decimal point is shifted to the right by two places.

= 156.1 × 100 = 15610

(xii) 0.03 × 1000 Solution:-

On multiplying a decimal by 1000, the decimal point is shifted to the right by three places.

= 0.03 × 1000 = 30

(H.W- Q2,iii,iv, vii,viii)

Q4. A two-wheeler covers a distance of 55.3 km in one litre of petrol. How much distance will it cover in 10 litres of petrol?

Solution:-

From the question, it is given that,

Distance covered by two-wheeler in 1L of petrol

= 55.3 km Then,

Distance covered by two wheeler in 10L of petrol

= (10 × 55.3)

= 553 km

∴Two-wheeler covers a distance in 10L of petrol is 553 km.

Q5. Find:

(i)2.5 × 0.3 (ii) 0.1 × 51.7 (iii) 0.2 × 316.8 (iv) 1.3 × 3.1 (v) 0.5 × 0.05 (vi) 11.2 × 0.15 (vii) 1.07 × 0.02 (viii) 10.05 × 1.05 (ix) 101.01 × 0.01 (x) 100.01 × 1.1

Solution:-

(i) $2.5 \times 0.3 = \frac{25}{10} \times \frac{3}{10} = \frac{75}{100}$

$= 0.75$

(ii) $0.1 \times 51.7 = \frac{1}{10} \times \frac{517}{10} = \frac{517}{100}$

$= 5.17$

(iii) $0.2 \times 316.8 = \frac{2}{10} \times \frac{3168}{10} = \frac{6336}{100}$

$= 63.36$

(iv) $1.3 \times 3.1 = \frac{13}{10} \times \frac{31}{10} = \frac{403}{100} = 4.03$

(H.W- Q5. v, vi, vii, x)

(viii) $10.05 \times 1.05 = \frac{1005}{100} \times \frac{105}{100}$

$= \frac{105525}{10000}$

$= 10.5525$

(ix) $101.01 \times 0.01 = \frac{10101}{100} \times \frac{1}{100}$

$= \frac{10101}{10000}$

$= 1.0101$

EXERCISE 2.7

Q1. Find:

(i)0.4 ÷ 2 (ii) 0.35 ÷ 5 (iii) 2.48 ÷ 4 (iv) 65.4 ÷ 6 (v) 651.2 ÷ 4 (vi) 14.49 ÷ 7 (vii) 3.96 ÷ 4 (viii) 0.80 ÷ 5

Solution:-

$$(i)\ 0.4 \div 2 = \frac{4}{10} \div 2$$
$$= \frac{4}{10} \times \frac{1}{2}$$
$$= \frac{1}{10} \times \frac{4}{2}$$
$$= \frac{1}{10} \times 2$$
$$= 0.2$$

$$(ii)\ 0.35 \div 5 = \frac{35}{100} \div 5$$
$$= \frac{35}{100} \times \frac{1}{5}$$
$$= \frac{1}{100} \times \frac{35}{5}$$
$$= \frac{1}{100} \times 7$$
$$= 0.07$$

$$(iii)\ 2.48 \div 4 = \frac{248}{100} \div 4$$

$$= \frac{248}{100} \times \frac{1}{4}$$

$$= \frac{1}{100} \times \frac{248}{4}$$

$$= \frac{1}{100} \times 62 = 0.62$$

$$(vi)\ 14.49 \div 7 = \frac{1449}{100} \div 7$$

$$= \frac{1449}{100} \times \frac{1}{7}$$

$$= \frac{1}{100} \times \frac{1449}{7}$$

$$= \frac{1}{100} \times 207 = 2.07$$

(*vii*) $3.96 \div 4 = \frac{396}{100} \div 4$

$= \frac{396}{100} \times \frac{1}{4}$

$= \frac{1}{100} \times \frac{396}{4}$

$= \frac{1}{100} \times 99 = 0.99$

(*viii*) $0.80 \div 5 = \frac{80}{100} \div 5$

$= \frac{80}{100} \times \frac{1}{5}$

$= \frac{1}{100} \times \frac{80}{5}$

$= \frac{1}{100} \times 16 = 0.16$

(H.W– Q1. V,Vi)

Dividing decimals by 10, 100, 100.....

$2510.0 \div 10 = 251.0$

$2510.0 \div 100 = 25.10$

$2510.0 \div 1000 = 2.51$

Try these

- $874.09 \div 10$
- $23.4 \div 100$
- $5087.8 \div 1000$

Q2. Find:

(i)4.8 ÷ 10 (ii) 52.5 ÷10 (iii) 0.7 ÷ 10 (iv) 33.1 ÷ 10 (v) 272.23 ÷ 10

(vi) 0.56 ÷ 10 (vii) 3.97 ÷ 10

Solution:-

(i) 4.8 ÷ 10 = 0.48 (Shifting the decimal point to the left by 1 place)

(ii) 52.5 ÷ 10 = 5.25 (Shifting the decimal point to the left by 1 place)

(iv) 33.1 ÷ 10 = 3.31 (Shifting the decimal point to the left by 1 place)

(vi) 0.56 4- 10 = 0.056(Shifting the decimal point to the left by 1 place)

(H.W- Q2. iii,v,vii)

Q3. Find:

(i) 2.7 ÷ 100 (ii) 0.3 ÷ 100 (iii) 0.78 ÷ 100 (iv) 432.6 ÷ 100

(v) 23.6 ÷ 100 (vi) 98.53 ÷ 100

Solution:-

(i) 2.7 ÷ 100 = 0.027(Shifting the decimal point to the left by 2 places)

(ii) 0.3 ÷ 100 = 0.003(Shifting the decimal point to the left by 2 places)

(vi) 98.53 ÷ 100 = 0.9853 (Shifting the decimal point to the left by 2 places)

(H.W Q3. iii,iv,v)

Q4. Find:

(i) 7.9 ÷ 1000 (ii) 26.3 ÷ 1000 (iii) 38.53 ÷ 1000 (iv) 128.9 ÷ 1000
(v) 0.5 ÷ 1000

Solution:-

(i) 7.9 ÷ 1000 = 0.0079 (Shifting the decimal point to the left by 3 places)

(iii) 38.53 ÷ 1000 = 0.03853 (Shifting the decimal point to the left by 3 places)

(v) 0.5 ÷ 1000 = 0.0005 (Shifting the decimal point to the left by 3 places)

(H.W- Q4. ii,iv)

Q5. Find:

(i) 7 ÷ 3.5 (ii) 36 ÷ 0.2 (iii) 3.25 ÷ 0.5 (iv) 30.94 ÷ 0.7 (v) 0.5 ÷ 0.25

(vi) 7.75 ÷ 0.25 (vii) 76.5 ÷ 0.15 (viii) 37.8 ÷ 1.4 (ix) 2.73 ÷ 1.3

Solution:-

$$(i)\ 7 \div 3.5 = \frac{7}{3.5} = \frac{70}{35} = 2$$

$$(iii)\ 3.25 \div 0.5 = \frac{3.25}{0.5} = \frac{1}{10} \times 65 = 6.5$$

$$(iv)\ 30.94 \div 0.7 = \frac{30.94}{0.7} = \frac{3094}{70} = \frac{1}{10} \times \frac{3094}{7} = \frac{1}{10} \times 442 = 44.2$$

(H.W- Q5. ii,vii,viii,ix)

$$(v)\ 0.5 \div 0.25 = \frac{0.5}{0.25} = \frac{50}{25} = 2$$

$$(vi)\ 7.75 \div 0.25 = \frac{7.75}{0.25} = \frac{775}{25} = 31$$

- **PRACTICE**

$$(vii)\ 76.5 \div 0.15 = \frac{76.5}{0.15} = \frac{7650}{15} = 510$$

$$(viii)\ 37.8 \div 1.4 = \frac{37.8}{1.4} = \frac{378}{14} = 27$$

$$(ix)\ 2.73 \div 1.3 = \frac{2.73}{1.3} = \frac{2.73}{1.30} = \frac{273}{130} = \frac{1}{10} \times \frac{273}{13} = \frac{1}{10} \times 21 = 2.1$$

Q6. A vehicle covers a distance of 43.2 km in 2.4 litres of petrol. How much distance will it cover in one litre of petrol?

Solution:-

Distance covered in 2.4 litres of petrol = 43.2 km

$$\therefore \text{Distance covered in 1 litre of petrol} = 43.2 \div 2.4$$

$$= \frac{432}{10} \div \frac{24}{10}$$

$$= \frac{432}{10} \times \frac{10}{24}$$

$$= 18$$

Therefore, the vehicle will cover 18 km in 1 litre petrol.

Recapitulation

- *Fractions*
- *Types of Fractions*
  - *Like Fraction*
  - *Unlike Fraction*
  - *Equivalent Fraction*
- *Converting Mixed into Improper Fraction.*
- *Converting Improper into Mixed Fraction.*
- *Adding Fractions*
- *Subtraction Fractions*
- *Multiplying Fractions*
- *Dividing Fractions*
- *Arranging Fractions*
- *Comparing Fractions*
- *Conversion Scale*

Thank You

DELHI PUBLIC SCHOOL, GANDHINAGAR
CHAPTER 4 SIMPLE EQUATIONS
MIND MAP

This chapter consists of six different topics. The most probable questions from the examination point of view are given below.

TYPE: 1 FRAMING EQUATION FOR THE GIVEN STATEMENTS.

Q.1 One fourth of a number minus 7 is 18.
Q.2 If you take away 6 from 6 times y, you get60
Q.3 If you add 3 to one-third of a number, you get 30.

TYPE: 2 WRITING STATEMENT FOR THE GIVEN EQUATIONS.

Q.1 $7x + 67 = 15$
Q.2 $32x + 6 = 15$
Q.3 $2p - 21 = 23$

TYPE: 3 CHECK WHETHER THE GIVEN VALUE IN THE BRACKETS IS THE SOLUTION TO THE GIVEN EQUATION OR NOT.

Q.1. $2x + 7 = 15$ ($x = -4$)
Q.2 $\frac{4}{6}q + 16 = 12$($q = 3$)
Q.3 $3n - 2 = 46$($n = 14$)

TYPE: 4 SETUP AN EQUATION FOR THE GIVEN CASES.

Q.1.Raju's father's age is 5 years more than three times Raju's age. Find Raju's age, if his father is 44 years old. (Assume Raju's age to be y years old).

Q.2. The length of a rectangular garden is six times the breadth. Find the length and breadth of the garden if perimeter of the garden is 28 m. (Assume breadth to be b metres.)

TYPE: 5 SOLVE THE GIVEN EQUATION USING EITHER BALANCING METHOD OR TRANSPOSING METHOD.

Q.1 $3n + 8 = 25$
Q.2 $4n - 7 = 25$
Q.3 $4(m + 3) = 18$
Q.4 $3(t + 2) + 4 = 12$
Q.5 $0 = 16 + 4(m - 6)$.

TYPE: 6 QUESTIONS BASED ON APPLICATION OF SIMPLE EQUATIONS IN REAL LIFE SITUATIONS. (DIFFERENT TYPES OF WORD PROBLEMS)

Q.1. Pankaj's age is 5 years more than three times the Reshma's age. Find Reshma's age if Pankaj's age is 44 years.

Q.2. Sachin scored twice as many runs as Rahul. Together their runs felt 4 runs short of a century. How many runs did each score?

Q.3. In an isosceles triangle, the base angles are equal. The vertex angle is 70°. What are the base angles of the triangle? (Remember, the sum of three angles of a triangle is equal to180°).

Q.4. People of Sundargram planted a total of 102 trees in the village garden. Some of the trees were fruit trees. The number of non-fruit trees was two more than three times the number of fruit trees. What was the number of fruit trees planted?

EXERCISE 4.1 PAGE: 81

1. Complete the last column of the table.

S. No.	Equation	Value	Say, whether the equation is satisfied. (Yes/No)
(i)	x + 3 = 0	x = 3	
(ii)	x + 3 = 0	x = 0	
(iii)	x + 3 = 0	x = -3	
(iv)	x – 7 = 1	x = 7	
(v)	x – 7 = 1	x = 8	
(vi)	5x = 25	x = 0	
(vii)	5x = 25	x = 5	
(viii)	5x = 25	x = -5	
(ix)	(m/3) = 2	m = - 6	
(x)	(m/3) = 2	m = 0	
(xi)	(m/3) = 2	m = 6	

Solution:-

(i) x + 3 = 0
LHS = x + 3
By substituting the value of x = 3
Then,
LHS = 3 + 3 = 6
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(ii) x + 3 = 0
LHS = x + 3
By substituting the value of x = 0
Then,
LHS = 0 + 3 = 3
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(iii) $x + 3 = 0$
LHS = $x + 3$
By substituting the value of $x = -3$
Then,
LHS = $-3 + 3 = 0$
By comparing LHS and RHS
LHS = RHS
∴Yes, the equation is satisfied

(iv) $x - 7 = 1$
LHS = $x - 7$
By substituting the value of $x = 7$
Then,
LHS = $7 - 7 = 0$
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied

(v) $x - 7 = 1$
LHS = $x - 7$
By substituting the value of $x = 8$
Then,
LHS = $8 - 7 = 1$
By comparing LHS and RHS
LHS = RHS
∴Yes, the equation is satisfied.

(vi) $5x = 25$
LHS = $5x$
By substituting the value of $x = 0$
Then,
LHS = $5 \times 0 = 0$
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(vii) $5x = 25$

LHS = 5x
By substituting the value of x = 5
Then,
LHS = 5 × 5 = 25
By comparing LHS and RHS
LHS = RHS
∴Yes, the equation is satisfied.

(viii) 5x = 25
LHS = 5x
By substituting the value of x = -5
Then,
LHS = 5 × (-5) = - 25
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(ix) m/3 = 2
LHS = m/3
By substituting the value of m = - 6
Then,
LHS = -6/3 = - 2
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(x) m/3 = 2
LHS = m/3
By substituting the value of m = 0
Then,
LHS = 0/3 = 0
By comparing LHS and RHS
LHS ≠ RHS
∴No, the equation is not satisfied.

(xi) m/3 = 2
LHS = m/3

By substituting the value of m = 6
Then,
LHS = 6/3 = 2
By comparing LHS and RHS
LHS = RHS
∴Yes, the equation is satisfied.

S. No.	Equation	Value	Say, whether the equation is satisfied. (Yes/No)
(i)	x + 3 = 0	x = 3	No
(ii)	x + 3 = 0	x = 0	No
(iii)	x + 3 = 0	x = -3	Yes
(iv)	x – 7 = 1	x = 7	No
(v)	x – 7 = 1	x = 8	Yes
(vi)	5x = 25	x = 0	No
(vii)	5x = 25	x = 5	Yes
(viii)	5x = 25	x = -5	No
(ix)	(m/3) = 2	m = - 6	No
(x)	(m/3) = 2	m = 0	No
(xi)	(m/3) = 2	m = 6	Yes

2. Check whether the value given in the brackets is a solution to the given equation or not:

(a) n + 5 = 19 (n = 1)

Solution:-

LHS = n + 5
By substituting the value of n = 1
Then,
LHS = n + 5
= 1 + 5
= 6
By comparing LHS and RHS
6 ≠ 19
LHS ≠ RHS
Hence, the value of n = 1 is not a solution to the given equation n + 5 = 19.

(b) 7n + 5 = 19 (n = – 2)

Solution:-

LHS = 7n + 5
By substituting the value of n = -2
Then,
LHS = 7n + 5
= (7 × (-2)) + 5
= - 14 + 5
= - 9
By comparing LHS and RHS
-9 ≠ 19
LHS ≠ RHS
Hence, the value of n = -2 is not a solution to the given equation 7n + 5 = 19.

(c) 7n + 5 = 19 (n = 2)
Solution:-
LHS = 7n + 5
By substituting the value of n = 2
Then,
LHS = 7n + 5
= (7 × (2)) + 5
= 14 + 5
= 19
By comparing LHS and RHS
19 = 19
LHS = RHS
Hence, the value of n = 2 is a solution to the given equation 7n + 5 = 19.

(d) 4p – 3 = 13 (p = 1)
Solution:-
LHS = 4p - 3
By substituting the value of p = 1
Then,
LHS = 4p - 3
= (4 × 1) - 3
= 4 - 3
= 1
By comparing LHS and RHS
1 ≠ 13

LHS ≠ RHS
Hence, the value of p = 1 is not a solution to the given equation 4p - 3 = 13.

(e) 4p – 3 = 13 (p = – 4)
Solution:-
LHS = 4p - 3
By substituting the value of p = - 4
Then,
LHS = 4p - 3
= (4 × (-4)) - 3
= -16 - 3
= -19
By comparing LHS and RHS
-19 ≠ 13
LHS ≠ RHS
Hence, the value of p = -4 is not a solution to the given equation 4p - 3 = 13.

(f) 4p – 3 = 13 (p = 0)
Solution:-
LHS = 4p - 3
By substituting the value of p = 0
Then,
LHS = 4p - 3
= (4 × 0) - 3
= 0 - 3
= -3
By comparing LHS and RHS
- 3 ≠ 13
LHS ≠ RHS
Hence, the value of p = 0 is not a solution to the given equation 4p - 3 = 13.

3. Solve the following equations by trial and error method:
(i) 5p + 2 = 17
Solution:-
LHS = 5p + 2
By substituting the value of p = 0
Then,

LHS = 5p + 2
= (5 × 0) + 2
= 0 + 2
= 2
By comparing LHS and RHS
2 ≠ 17
LHS ≠ RHS
Hence, the value of p = 0 is not a solution to the given equation.

Let, p = 1
LHS = 5p + 2
= (5 × 1) + 2
= 5 + 2
= 7
By comparing LHS and RHS
7 ≠ 17
LHS ≠ RHS
Hence, the value of p = 1 is not a solution to the given equation.

Let, p = 2
LHS = 5p + 2
= (5 × 2) + 2
= 10 + 2
= 12
By comparing LHS and RHS
12 ≠ 17
LHS ≠ RHS
Hence, the value of p = 2 is not a solution to the given equation.

Let, p = 3
LHS = 5p + 2
= (5 × 3) + 2
= 15 + 2
= 17
By comparing LHS and RHS
17 = 17
LHS = RHS

Hence, the value of p = 3 is a solution to the given equation.

(ii) 3m – 14 = 4

Solution:-

LHS = 3m - 14

By substituting the value of m = 3

Then,

LHS = 3m - 14

= (3 × 3) - 14

= 9 - 14

= - 5

By comparing LHS and RHS

-5 ≠ 4

LHS ≠ RHS

Hence, the value of m = 3 is not a solution to the given equation.

Let, m = 4

LHS = 3m - 14

= (3 × 4) - 14

= 12 - 14

= - 2

By comparing LHS and RHS

-2 ≠ 4

LHS ≠ RHS

Hence, the value of m = 4 is not a solution to the given equation.

Let, m = 5

LHS = 3m - 14

= (3 × 5) - 14

= 15 - 14

= 1

By comparing LHS and RHS

1 ≠ 4

LHS ≠ RHS

Hence, the value of m = 5 is not a solution to the given equation.

Let, m = 6

LHS = 3m - 14
= (3 × 6) - 14
= 18 - 14
= 4
By comparing LHS and RHS
4 = 4
LHS = RHS
Hence, the value of m = 6 is a solution to the given equation.

4. Write equations for the following statements:
(i) The sum of numbers x and 4 is 9.
Solution:-
The above statement can be written in the equation form as,
= x + 4 = 9

(ii) 2 subtracted from y is 8.
Solution:-
The above statement can be written in the equation form as,
= y - 2 = 8

(iii) Ten times a is 70.
Solution:-
The above statement can be written in the equation form as,
= 10a = 70

(iv) The number b divided by 5 gives 6.
Solution:-
The above statement can be written in the equation form as,
= (b/5) = 6

(v) Three-fourth of t is 15.
Solution:-
The above statement can be written in the equation form as,
= ¾t = 15

(vi) Seven times m plus 7 gets you 77.
Solution:-

The above statement can be written in the equation form as,
Seven times m is 7m
= 7m + 7 = 77

(vii) One-fourth of a number x minus 4 gives 4.
Solution:-
The above statement can be written in the equation form as,
One-fourth of a number x is x/4
= x/4 – 4 = 4

(viii) If you take away 6 from 6 times y, you get 60.
Solution:-
The above statement can be written in the equation form as,
6 times of y is 6y
= 6y – 6 = 60

(ix) If you add 3 to one-third of z, you get 30.
Solution:-
The above statement can be written in the equation form as,
One-third of z is z/3
= 3 + z/3 = 30

5. Write the following equations in statement forms:
(i) p + 4 = 15
Solution:-
The sum of numbers p and 4 is 15.

(ii) m – 7 = 3
Solution:-
7 subtracted from m is 3.

(iii) 2m = 7
Solution:-
Twice of number m is 7.

(iv) m/5 = 3
Solution:-

The number m divided by 5 gives 3.

(v) (3m)/5 = 6
Solution:-
Three-fifth of m is 6.

(vi) 3p + 4 = 25
Solution:-
Three times p plus 4 gives you 25.

(vii) 4p – 2 = 18
Solution:-
Four times p minus 2 gives you 18.

(viii) p/2 + 2 = 8
Solution-
If you add half of a number p to 2, you get 8.

6. Set up an equation in the following cases:
(i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. (Take m to be the number of Parmit's marbles.)
Solution:-
From the question it is given that,
Number of Parmit's marbles = m
Then,
Irfan has 7 marbles more than five times the marbles Parmit has
= 5 × Number of Parmit's marbles + 7 = Total number of marbles Irfan having
= (5 × m) + 7 = 37
= 5m + 7 = 37

(ii) Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. (Take Laxmi's age to be y years.)
Solution:-
From the question it is given that,
Let Laxmi's age to be = y years old
Then,
Lakshmi's father is 4 years older than three times of her age

= 3 × Laxmi's age + 4 = Age of Lakshmi's father
= (3 × y) + 4 = 49
= 3y + 4 = 49

(iii) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. (Take the lowest score to be l.)

Solution:-

From the question it is given that,
Highest score in the class = 87
Let lowest score be l
= 2 × Lowest score + 7 = Highest score in the class
= (2 × l) + 7 = 87
= 2l + 7 = 87

(iv) In an isosceles triangle, the vertex angle is twice either base angle. (Let the base angle be b in degrees. Remember that the sum of angles of a triangle is 180 degrees).

Solution:-

From the question it is given that,
We know that, the sum of angles of a triangle is 180^o
Let base angle be b
Then,
Vertex angle = 2 × base angle = 2b
= b + b + 2b = 180^o
= 4b = 180^o

EXERCISE 4.2 PAGE: 86

1. Give first the step you will use to separate the variable and then solve the equation:

(a) $x - 1 = 0$

Solution:-

We have to add 1 to both the side of given equation,

Then we get,

$= x - 1 + 1 = 0 + 1$

$= x = 1$

(b) $x + 1 = 0$

Solution:-

We have to subtract 1 to both the side of given equation,

Then we get,

$= x + 1 - 1 = 0 - 1$

$= x = - 1$

(c) $x - 1 = 5$

Solution:-

We have to add 1 to both the side of given equation,

Then we get,

$= x - 1 + 1 = 5 + 1$

$= x = 6$

(d) $x + 6 = 2$

Solution:-

We have to subtract 6 to both the side of given equation,

Then we get,

$= x + 6 - 6 = 2 - 6$

$= x = - 4$

(e) $y - 4 = - 7$

Solution:-

We have to add 4 to both the side of given equation,

Then we get,

$= y - 4 + 4 = - 7 + 4$

$= y = - 3$

(f) $y - 4 = 4$
Solution:-
We have to add 4 to both the side of given equation,
Then we get,
$= y - 4 + 4 = 4 + 4$
$= y = 8$

(g) $y + 4 = 4$
Solution:-
We have to subtract 4 to both the side of given equation,
Then we get,
$= y + 4 - 4 = 4 - 4$
$= y = 0$

(h) $y + 4 = -4$
Solution:-
We have to subtract 4 to both the side of given equation,
Then we get,
$= y + 4 - 4 = -4 - 4$
$= y = -8$

2. Give first the step you will use to separate the variable and then solve the equation:
(a) 3l = 42
Solution:-
Now we have to divide both sides of the equation by 3,
Then we get,
$= 3l/3 = 42/3$
$= l = 14$

(b) b/2 = 6
Solution:-
Now we have to multiply both sides of the equation by 2,
Then we get,
$= b/2 \times 2 = 6 \times 2$
$= b = 12$

(c) p/7 = 4

Solution:-

Now we have to multiply both sides of the equation by 7,

Then we get,

= p/7 × 7= 4 × 7

= p = 28

(d) 4x = 25

Solution:-

Now we have to divide both sides of the equation by 4,

Then we get,

= 4x/4 = 25/4

= x = 25/4

(e) 8y = 36

Solution:-

Now we have to divide both sides of the equation by 8,

Then we get,

= 8y/8 = 36/8

= x = 9/4

(f) (z/3) = (5/4)

Solution:-

Now we have to multiply both sides of the equation by 3,

Then we get,

= (z/3) × 3 = (5/4) × 3

= x = 15/4

(g) (a/5) = (7/15)

Solution:-

Now we have to multiply both sides of the equation by 5,

Then we get,

= (a/5) × 5 = (7/15) × 5

= a = 7/3

(g) 20t = - 10

Solution:-

Now we have to divide both sides of the equation by 20,

Then we get,

= 20t/20 = -10/20

= x = - ½

3. Give the steps you will use to separate the variable and then solve the equation:

(a) 3n – 2 = 46

Solution:-

First we have to add 2 to the both sides of the equation,

Then, we get,

= 3n – 2 + 2 = 46 + 2

= 3n = 48

Now,

We have to divide both sides of the equation by 3,

Then, we get,

= 3n/3 = 48/3

= n = 16

(b) 5m + 7 = 17

Solution:-

First we have to subtract 7 to the both sides of the equation,

Then, we get,

= 5m + 7 - 7 = 17 - 7

= 5m = 10

Now,

We have to divide both sides of the equation by 5,

Then, we get,

= 5m/5 = 10/5

= m = 2

(c) 20p/3 = 40

Solution:-

First we have to multiply both sides of the equation by 3,

Then, we get,

= (20p/3) × 3 = 40 × 3

= 20p = 120

Now,

We have to divide both sides of the equation by 20,

Then, we get,

= 20p/20 = 120/20

= p = 6

(d) 3p/10 = 6

Solution:-

First we have to multiply both sides of the equation by 10,

Then, we get,

= (3p/10) × 10 = 6 × 10

= 3p = 60

Now,

We have to divide both sides of the equation by 3,

Then, we get,

= 3p/3 = 60/3

= p = 20

4. Solve the following equations:

(a) 10p = 100

Solution:-

Now,

We have to divide both sides of the equation by 10,

Then, we get,

= 10p/10 = 100/10

= p = 10

(b) 10p + 10 = 100

Solution:-

First we have to subtract 10 to the both sides of the equation,

Then, we get,

= 10p + 10 - 10 = 100 - 10

= 10p = 90

Now,

We have to divide both sides of the equation by 10,

Then, we get,

= 10p/10 = 90/10

= p = 9

(c) p/4 = 5
Solution:-
Now,
We have to multiply both sides of the equation by 4,
Then, we get,
= p/4 × 4 = 5 × 4
= p = 20

(d) - p/3 = 5
Solution:-
Now,
We have to multiply both sides of the equation by - 3,
Then, we get,
= - p/3 × (- 3) = 5 × (- 3)
= p = - 15

(e) 3p/4 = 6
Solution:-
First we have to multiply both sides of the equation by 4,
Then, we get,
= (3p/4) × (4) = 6 × 4
= 3p = 24
Now,
We have to divide both sides of the equation by 3,
Then, we get,
= 3p/3 = 24/3
= p = 8

(f) 3s = - 9
Solution:-
Now,
We have to divide both sides of the equation by 3,
Then, we get,
= 3s/3 = -9/3
= s = -3

(g) 3s + 12 = 0

Solution:-

First we have to subtract 12 to the both sides of the equation,

Then, we get,

= 3s + 12 - 12 = 0 - 12

= 3s = -12

Now,

We have to divide both sides of the equation by 3,

Then, we get,

= 3s/3 = -12/3

= s = - 4

(h) 3s = 0

Solution:-

Now,

We have to divide both sides of the equation by 3,

Then, we get,

= 3s/3 = 0/3

= s = 0

(i) 2q = 6

Solution:-

Now,

We have to divide both sides of the equation by 2,

Then, we get,

= 2q/2 = 6/2

= q = 3

(j) 2q - 6 = 0

Solution:-

First we have to add 6 to the both sides of the equation,

Then, we get,

= 2q - 6 + 6 = 0 + 6

= 2q = 6

Now,

We have to divide both sides of the equation by 2,

Then, we get,

= 2q/2 = 6/2

= q = 3

(k) 2q + 6 = 0

Solution:-

First we have to subtract 6 to the both sides of the equation,

Then, we get,

= 2q + 6 - 6 = 0 - 6

= 2q = - 6

Now,

We have to divide both sides of the equation by 2,

Then, we get,

= 2q/2 = - 6/2

= q = - 3

(l) 2q + 6 = 12

Solution:-

First we have to subtract 6 to the both sides of the equation,

Then, we get,

= 2q + 6 - 6 = 12 - 6

= 2q = 6

Now,

We have to divide both sides of the equation by 2,

Then, we get,

= 2q/2 = 6/2

= q = 3

EXERCISE 4.3 PAGE: 89

1. Solve the following equations:

(a) 2y + (5/2) = (37/2)

Solution:-

By transposing (5/2) from LHS to RHS it becomes -5/2

Then,

= 2y = (37/2) – (5/2)

= 2y = (37-5)/2

= 2y = 32/2

Now,

Divide both side by 2,

= 2y/2 = (32/2)/2

= y = (32/2) × (1/2)

= y = 32/4

= y = 8

(b) 5t + 28 = 10

Solution:-

By transposing 28 from LHS to RHS it becomes -28

Then,

= 5t = 10 – 28

= 5t = - 18

Now,

Divide both side by 5,

= 5t/5= -18/5

= t = -18/5

(c) (a/5) + 3 = 2

Solution:-

By transposing 3 from LHS to RHS it becomes -3

Then,

= a/5 = 2 – 3

= a/5 = - 1

Now,

Multiply both side by 5,

= (a/5) × 5= -1 × 5

= a = -5

(d) (q/4) + 7 = 5

Solution:-

By transposing 7 from LHS to RHS it becomes -7

Then,

= q/4 = 5 – 7

= q/4 = - 2

Now,

Multiply both side by 4,

= (q/4) × 4= -2 × 4

= a = -8

(e) (5/2) x = -5

Solution:-

First we have to multiply both the side by 2,

= (5x/2) × 2 = - 5 × 2

= 5x = - 10

Now,

We have to divide both the side by 5,

Then we get,

= 5x/5 = -10/5

= x = -2

(f) (5/2) x = 25/4

Solution:-

First we have to multiply both the side by 2,

= (5x/2) × 2 = (25/4) × 2

= 5x = (25/2)

Now,

We have to divide both the side by 5,

Then we get,

= 5x/5 = (25/2)/5

= x = (25/2) × (1/5)

= x = (5/2)

(g) 7m + (19/2) = 13

Solution:-

By transposing (19/2) from LHS to RHS it becomes -19/2

Then,

= 7m = 13 – (19/2)

= 7m = (26 - 19)/2

= 7m = 7/2

Now,

Divide both side by 7,

= 7m/7 = (7/2)/7

= m = (7/2) × (1/7)

= m = ½

(h) 6z + 10 = - 2

Solution:-

By transposing 10 from LHS to RHS it becomes - 10

Then,

= 6z = -2 – 10

= 6z = - 12

Now,

Divide both side by 6,

= 6z/6 = -12/6

= m = - 2

(i) (3/2) l = 2/3

Solution:-

First we have to multiply both the side by 2,

= (3l/2) × 2 = (2/3) × 2

= 3l = (4/3)

Now,

We have to divide both the side by 3,

Then we get,

= 3l/3 = (4/3)/3

= l = (4/3) × (1/3)

= x = (4/9)

(j) (2b/3) - 5 = 3

Solution:-

By transposing -5 from LHS to RHS it becomes 5
Then,
= 2b/3 = 3 + 5
= 2b/3 = 8
Now,
Multiply both side by 3,
= (2b/3) × 3= 8 × 3
= 2b = 24
And,
Divide both side by 2,
= 2b/2 = 24/2
= b = 12

2. Solve the following equations:
(a) 2(x + 4) = 12
Solution:-
Let us divide both the side by 2,
= (2(x + 4))/2 = 12/2
= x + 4 = 6
By transposing 4 from LHS to RHS it becomes -4
= x = 6 – 4
= x = 2

(b) 3(n – 5) = 21
Solution:-
Let us divide both the side by 3,
= (3(n - 5))/3 = 21/3
= n - 5 = 7
By transposing -5 from LHS to RHS it becomes 5
= n = 7 + 5
= n = 12

(c) 3(n – 5) = – 21
Solution:-
Let us divide both the side by 3,
= (3(n - 5))/3 = - 21/3

= n - 5 = -7

By transposing -5 from LHS to RHS it becomes 5

= n = - 7 + 5

= n = - 2

(d) – 4(2 + x) = 8

Solution:-

Let us divide both the side by -4,

= (-4(2 + x))/ (-4) = 8/ (-4)

= 2 + x = -2

By transposing 2 from LHS to RHS it becomes - 2

= x = -2 - 2

= x = - 4

(e) 4(2 – x) = 8

Solution:-

Let us divide both the side by 4,

= (4(2 - x))/ 4 = 8/ 4

= 2 - x = 2

By transposing 2 from LHS to RHS it becomes - 2

= - x = 2 - 2

= - x = 0

= x = 0

3. Solve the following equations:

(a) 4 = 5(p – 2)

Solution:-

Let us divide both the side by 5,

= 4/5 = (5(p – 2))/5

= 4/5 = p -2

By transposing - 2 from RHS to LHS it becomes 2

= (4/5) + 2 = p

= (4 + 10)/ 5 = p

= p = 14/5

(b) – 4 = 5(p – 2)

Solution:-

Let us divide both the side by 5,

= - 4/5 = (5(p – 2))/5

= - 4/5 = p -2

By transposing - 2 from RHS to LHS it becomes 2

= - (4/5) + 2 = p

= (- 4 + 10)/ 5 = p

= p = 6/5

(c) 16 = 4 + 3(t + 2)

Solution:-

By transposing 4 from RHS to LHS it becomes – 4

= 16 – 4 = 3(t + 2)

= 12 = 3(t + 2)

Let us divide both the side by 3,

= 12/3 = (3(t + 2))/ 3

= 4 = t + 2

By transposing 2 from RHS to LHS it becomes - 2

= 4 – 2 = t

= t = 2

(d) 4 + 5(p – 1) =34

Solution:-

By transposing 4 from LHS to RHS it becomes – 4

= 5(p – 1) = 34 – 4

= 5(p - 1) = 30

Let us divide both the side by 5,

= (5(p - 1))/ 5 = 30/5

= p – 1 = 6

By transposing - 1 from RHS to LHS it becomes 1

= p = 6 + 1

= p = 7

(e) 0 = 16 + 4(m – 6)

Solution:-

By transposing 16 from RHS to LHS it becomes – 16

= 0 – 16 = 4(m - 6)

= - 16 = 4(m - 6)

Let us divide both the side by 4,

= - 16/4 = (4(m - 6))/ 4

= - 4 = m - 6

By transposing - 6 from RHS to LHS it becomes 6

= - 4 + 6 = m

= m = 2

4. (a) Construct 3 equations starting with x = 2

Solution:-

First equation is,

Multiply both side by 6

= 6x = 12 … [equation 1]

Second equation is,

Subtracting 4 from both side,

= 6x – 4 = 12 -4

= 6x – 4 = 8 … [equation 2]

Third equation is,

Divide both side by 6

= (6x/6) – (4/6) = (8/6)

= x – (4/6) = (8/6) … [equation 3]

(b) Construct 3 equations starting with x = – 2

Solution:-

First equation is,

Multiply both side by 5

= 5x = -10 … [equation 1]

Second equation is,

Subtracting 3 from both side,

= 5x – 3 = - 10 – 3

= 5x - 3 = - 13 … [equation 2]

Third equation is,

Dividing both sides by 2

= (5x/2) – (3/2) = (-13/2) … [equation 3]

EXERCISE 4.4 PAGE: 91

1. Set up equations and solve them to find the unknown numbers in the following cases:

(a) Add 4 to eight times a number; you get 60.

Solution:-

Let us assume the required number be x

Eight times a number = 8x

The given above statement can be written in the equation form as,

= 8x + 4 = 60

By transposing 4 from LHS to RHS it becomes – 4

= 8x = 60 – 4

= 8x = 56

Divide both side by 8,

Then we get,

= (8x/8) = 56/8

= x = 7

(b) One-fifth of a number minus 4 gives 3.

Solution:-

Let us assume the required number be x

One-fifth of a number = (1/5) x = x/5

The given above statement can be written in the equation form as,

= (x/5) - 4 = 3

By transposing - 4 from LHS to RHS it becomes 4

= x/5 = 3 + 4

= x/5 = 7

Multiply both side by 5,

Then we get,

= (x/5) × 5 = 7 × 5

= x = 35

(c) If I take three-fourths of a number and add 3 to it, I get 21.

Solution:-

Let us assume the required number be x

Three-fourths of a number = (3/4) x

The given above statement can be written in the equation form as,

= (3/4) x + 3 = 21

By transposing 3 from LHS to RHS it becomes - 3

= (3/4) x = 21 - 3

= (3/4) x = 18

Multiply both side by 4,

Then we get,

= (3x/4) × 4 = 18 × 4

= 3x = 72

Then,

Divide both side by 3,

= (3x/3) = 72/3

= x = 24

(d) When I subtracted 11 from twice a number, the result was 15.

Solution:-

Let us assume the required number be x

Twice a number = 2x

The given above statement can be written in the equation form as,

= 2x –11 = 15

By transposing -11 from LHS to RHS it becomes 11

= 2x = 15 + 11

= 2x = 26

Then,

Divide both side by 2,

= (2x/2) = 26/2

= x = 13

(e) Munna subtracts thrice the number of notebooks he has from 50, he finds the result to be 8.

Solution:-

Let us assume the required number be x

Thrice the number = 3x

The given above statement can be written in the equation form as,

= 50 – 3x = 8

By transposing 50 from LHS to RHS it becomes - 50

= - 3x = 8 - 50

= -3x = - 42

Then,

Divide both side by -3,

= (-3x/-3) = - 42/-3

= x = 14

(f) Ibenhal thinks of a number. If she adds 19 to it and divides the sum by 5, she will get 8.

Solution:-

Let us assume the required number be x

The given above statement can be written in the equation form as,

= (x + 19)/5 = 8

Multiply both side by 5,

= ((x + 19)/5) × 5 = 8 × 5

= x + 19 = 40

Then,

By transposing 19 from LHS to RHS it becomes - 19

= x = 40 - 19

= x = 21

(g) Anwar thinks of a number. If he takes away 7 from 5/2 of the number, the result is 23.

Solution:-

Let us assume the required number be x

5/2 of the number = (5/2) x

The given above statement can be written in the equation form as,

= (5/2) x - 7 = 23

By transposing -7 from LHS to RHS it becomes 7

= (5/2) x = 23 + 7

= (5/2) x = 30

Multiply both side by 2,

= ((5/2) x) × 2 = 30 × 2

= 5x = 60

Then,

Divide both the side by 5

= 5x/5 = 60/5

= x = 12

2. Solve the following:

(a) The teacher tells the class that the highest marks obtained by a student in her class is twice the lowest marks plus 7. The highest score is 87. What is the lowest score?

Solution:-

Let us assume the lowest score be x

From the question it is given that,

The highest score is = 87

Highest marks obtained by a student in her class is twice the lowest marks plus 7= 2x + 7

5/2 of the number = (5/2) x

The given above statement can be written in the equation form as,

Then,

= 2x + 7 = Highest score

= 2x + 7 = 87

By transposing 7 from LHS to RHS it becomes -7

= 2x = 87 - 7

= 2x = 80

Now,

Divide both the side by 2

= 2x/2 = 80/2

= x = 40

Hence, the lowest score is 40

(b) In an isosceles triangle, the base angles are equal. The vertex angle is 40°. What are the base angles of the triangle? (Remember, the sum of three angles of a triangle is 180°).

Solution:-

From the question it is given that,

We know that, the sum of angles of a triangle is 180^o

Let base angle be b

Then,

= b + b + 40^o = 180^o

= 2b + 40 = 180^o

By transposing 40 from LHS to RHS it becomes -40

= 2b = 180 – 40

= 2b = 140

Now,

Divide both the side by 2

= 2b/2 = 140/2

= b = 70^o

Hence, 70^o is the base angle of an isosceles triangle.

(c) Sachin scored twice as many runs as Rahul. Together, their runs fell two short of a double century. How many runs did each one score?

Solution:-

Let us assume Rahul's score be x

Then,

Sachin scored twice as many runs as Rahul is 2x

Together, their runs fell two short of a double century,

= Rahul's score + Sachin's score = 200 – 2

= x + 2x = 198

= 3x = 198

Divide both the side by 3,

= 3x/3 = 198/3

= x = 66

So, Rahul's score is 66

And Sachin's score is 2x = 2 × 66 = 132

3. Solve the following:

(i) Irfan says that he has 7 marbles more than five times the marbles Parmit has. Irfan has 37 marbles. How many marbles does Parmit have?

Solution:-

Let us assume number of Parmit's marbles = m

From the question it is given that,

Then,

Irfan has 7 marbles more than five times the marbles Parmit has

= 5 × Number of Parmit's marbles + 7 = Total number of marbles Irfan having

= (5 × m) + 7 = 37

= 5m + 7 = 37

By transposing 7 from LHS to RHS it becomes -7

= 5m = 37 – 7

= 5m = 30

Divide both the side by 5

= 5m/5 = 30/5

= m = 6

So, Permit has 6 marbles

(ii) Laxmi's father is 49 years old. He is 4 years older than three times Laxmi's age. What is Laxmi's age?

Solution:-

Let Laxmi's age to be = y years old

From the question it is given that,

Lakshmi's father is 4 years older than three times of her age

= 3 × Laxmi's age + 4 = Age of Lakshmi's father

= (3 × y) + 4 = 49

= 3y + 4 = 49

By transposing 4 from LHS to RHS it becomes -4

= 3y = 49 - 4

= 3y = 45

Divide both the side by 3

= 3y/3 = 45/3

= y = 15

So, Lakshmi's age is 15 years.

(iii) People of Sundargram planted trees in the village garden. Some of the trees were fruit trees. The number of non-fruit trees were two more than three times the number of fruit trees. What was the number of fruit trees planted if the number of non-fruit trees planted was 77?

Solution:-

Let the number of fruit tress be f.

From the question it is given that,

3 × number of fruit trees + 2 = number of non-fruit trees

= 3f + 2 = 77

By transposing 2 from LHS to RHS it becomes -2

=3f = 77 – 2

= 3f = 75

Divide both the side by 3

= 3f/3 = 75/3

= f = 25

So, number of fruit tree was 25.

4. Solve the following riddle:

I am a number,

Tell my identity!

Take me seven times over

And add a fifty!

To reach a triple century

You still need forty!

Solution:-

Let us assume the number be x.

Take me seven times over and add a fifty = 7x + 50

To reach a triple century you still need forty = (7x + 50) + 40 = 300

= 7x + 50 + 40 = 300

= 7x + 90 = 300

By transposing 90 from LHS to RHS it becomes -90

= 7x = 300 – 90

= 7x = 210

Divide both side by 7

= 7x/7 = 210/7

= x = 30

Hence the number is 30.

DELHI PUBLIC SCHOOL, GANDHINAGAR

CHAPTER 5: LINES AND ANGLES

MIND MAP

This chapter consists of two different topics. The most probable questions from the examination point of view are given below.

TYPE: 1 FINDING THE RELATED ANGLES FOR THE GIVEN PAIRS OF LINES.

(i) Pairs of vertically opposite angles.

(ii) Linear pairs

(iii) Complementary angles

(iv) Supplementary angles

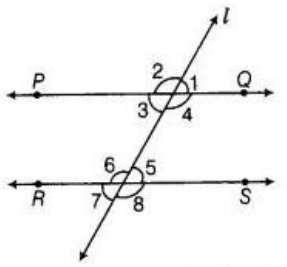
TYPE: 2 FINDING THE RELATED ANGLES FOR THE GIVEN PAIRS OF PARALLEL LINES.

(i) Pair of alternate angles

(ii) Pair of interior angles

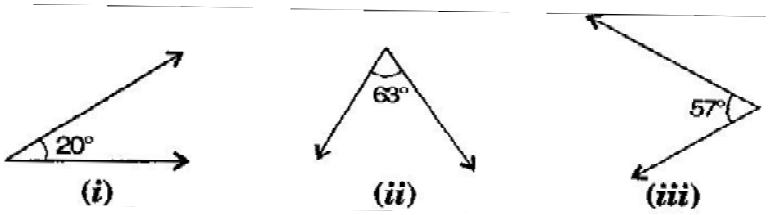
(iii) Pair of corresponding angles

(iv) If measurement of anlge 2 is 120 °.

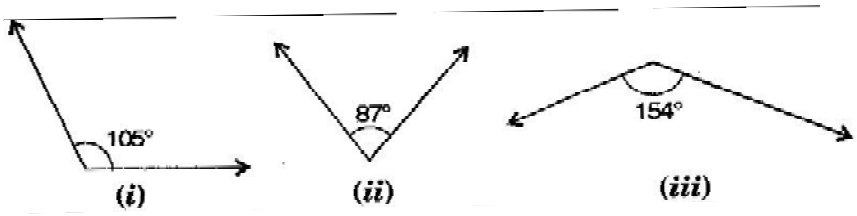


Class –VII Mathematics (Ex. 5.1)
Questions

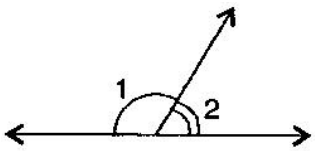
1. Find the complement of each of the following angles:



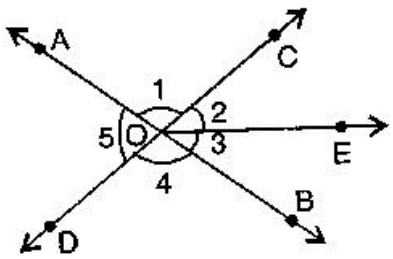
2. Find the supplement of each of the following angles:



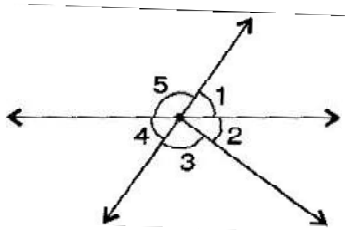
3. Identify which of the following pairs of angles are complementary and which are supplementary:
   (i) $65°, 115°$ (ii) $63°, 27°$ (iii) $112°, 68°$
   (iv) $130°, 50°$ (v) $45°, 45°$ (vi) $80°, 10°$
4. Find the angle which is equal to its complement:
5. Find the angle which is equal to its supplement.
6. In the given figure, $\angle 1$ and $\angle 2$ are supplementary angles. If $\angle 1$ is decreased, what changes should take place in $\angle 2$ so that both the angles still remain supplementary?



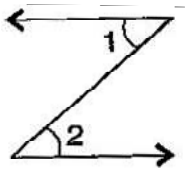
7. Can two angles be supplementary if both of them are:
   (i) acute (ii) obtuse (iii) right?
8. An angle is greater than 45°. Is its complementary angle greater than 45° or equal to 45° or less than 45°?
9. In the adjoining figure:
   (i) Is $\angle 1$ adjacent to $\angle 2$?
   (ii) Is $\angle AOC$ adjacent to $\angle AOE$?
   (iii) Do $\angle COE$ and $\angle EOD$ form a linear pair?
   (iv) Are $\angle BOD$ and $\angle DOA$ supplementary?
   (v) Is $\angle 1$ vertically opposite to $\angle 4$?
   (vi) What is the vertically opposite angle of $\angle 5$?



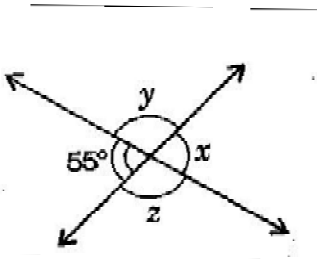
10. Indicate which pairs of angles are:
    (i) Vertically opposite angles?
    (ii) Linear pairs?



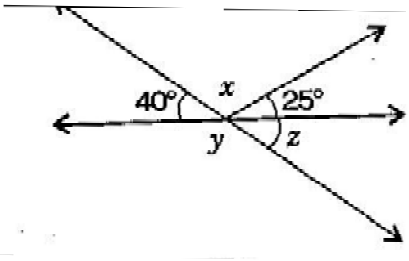
11. In the following figure, is $\angle 1$ adjacent to $\angle 2$? Give reasons.



12. Find the values of the angles x, y and z in each of the following:



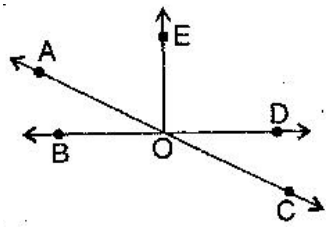
(i)



(ii)

13. Fill in the blanks:
    (i) If two angles are complementary, then the sum of their measures is _____.
    (ii) If two angles are supplementary, then the sum of their measures is _____.
    (iii) Two angles forming a linear pair are _____.
    (iv) If two adjacent angles are supplementary, they form a _____.
    (v) If two lines intersect a point, then the vertically opposite angles are always _____.
    (vi) If two lines intersect at a point and if one pair of vertically opposite angles are acute angles, then the other pair of vertically opposite angles are _____.

14. In the adjoining figure, name the following pairs of angles:
    (i) Obtuse vertically opposite angles.
    (ii) Adjacent complementary angles.
    (iii) Equal supplementary angles.
    (iv) Unequal supplementary angles.
    (v) Adjacent angles that do not form a linear pair.



Class –VII Mathematics (Ex. 5.1)

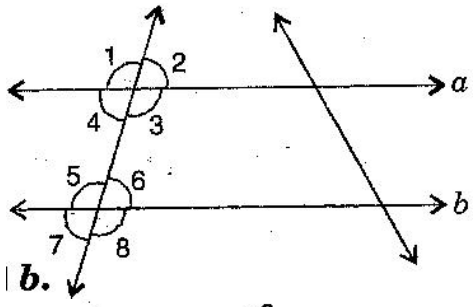
Answers

1. Complementary angle = $90^\circ -$ given angle
   (i) Complement of $20^\circ = 90^\circ - 20^\circ = 70^\circ$
   (ii) Complement of $63^\circ = 90^\circ - 63^\circ = 27^\circ$
   (iii) Complement of $57^\circ = 90^\circ - 57^\circ = 33^\circ$
2. Supplementary angle = $180^\circ -$ given angle
   (i) Supplement of $105^\circ = 180^\circ - 105^\circ = 75^\circ$
   (ii) Supplement of $87^\circ = 180^\circ - 87^\circ = 93^\circ$
   (iii) Supplement of $154^\circ = 180^\circ - 154^\circ = 26^\circ$
3. If sum of two angles is 180°, then they are called supplementary angles.
   If sum of two angles is 90°, then they are called complementary angles.
   (i) $65° + 115° = 180°$ These are supplementary angles.
   (ii) $63° + 27° = 90°$ These are complementary angles.
   (iii) $112° + 68° = 180°$ These are supplementary angles.
   (iv) $130° + 50° = 180°$ These are supplementary angles.
   (v) $45^\circ + 45^\circ = 90^\circ$ These are complementary angles.
   (vi) $80° + 10° = 90°$ These are complementary angles.
4. Let one of the two equal complementary angles be x.
   $\therefore \quad x + x = 90^\circ \quad \Rightarrow \quad 2x = 90^\circ \quad \Rightarrow \quad x = \frac{90^\circ}{2} = 45^\circ$
   Thus, 45° is equal to its complement.
5. Let x be two equal angles of its supplement.
   Therefore, $x + x = 180°$ [Supplementary angles]
   $\Rightarrow \quad 2x = 180°$
   $\Rightarrow \quad x = \frac{180°}{2} = 90^\circ$
   Thus, 90° is equal to its supplement.
6. I f $\angle 1$ is decreased then, $\angle 2$ will increase with the same measure, so that both the angles still remain supplementary.
7. (i) No, because sum of two acute angles is less than 180°.
   (ii) No, because sum of two obtuse angles is more than 180°.
   (iii) Yes, because sum of two right angles is 180°.
8. Let the complementary angles be x and y, i.e., $x + y = 90^\circ$
   It is given that $x > 45^\circ$
   Adding y both sides, $x + y > 45^\circ + y$
   $\Rightarrow \quad 90^\circ > 45^\circ + y \quad \Rightarrow \quad 90^\circ - 45^\circ > y \quad \Rightarrow \quad y < 45^\circ$
   Thus, its complementary angle is less than 45°.

9. (i) Yes, in $\angle AOE$, OC is common arm.
   (ii) No, they have no non-common arms on opposite side of common arm.
   (iii) Yes, they form linear pair.
   (iv) Yes, they are supplementary.
   (v) Yes, they are vertically opposite angles.
   (vi) Vertically opposite angles of $\angle 5$ is $\angle COB$.
10. (i) Vertically opposite angles, $\angle 1$, $\angle 4$; $\angle 5$, $\angle 2 + \angle 3$.
   (ii) Linear pairs $\angle 1$, $\angle 5$; $\angle 5$, $\angle 4$.
11. $\angle 1$ and $\angle 2$ are not adjacent angles because their vertex is not common.
12. (i) $x = 55°$ [Vertically opposite angles]
   Now $55° + y = 180°$ [Linear pair]
   $\Rightarrow$ $y = 180° - 55° = 125°$
   Also $y = z = 125°$ [Vertically opposite angles]
   Thus, $x = 55°, y = 125°$ and $z = 125°$.
   (ii) $40° + x + 25° = 180°$ [Angles on straight line]
   $\Rightarrow$ $65° + x = 180°$
   $\Rightarrow$ $x = 180° - 65° = 115°$
   Now $40° + y = 180°$ [Linear pair]
   $\Rightarrow$ $y = 180° - 40° = 140°$ .....(i)
   Also $y + z = 180°$ [Linear pair]
   $\Rightarrow$ $140° + z = 180°$ [From eq. (i)]
   $\Rightarrow$ $z = 180° - 140° = 40°$
   Thus, $x = 115°, y = 140°$ and $z = 40°$.
13. (i) 90° (ii) $180°$ (iii) supplementary
   (iv) linear pair (v) equal (vi) obtuse angles
14. (i) Obtuse vertically opposite angles means greater than 90° and equal $\angle AOD = \angle BOC$.
   (ii) Adjacent complementary angles means angles have common vertex, common arm, non-common arms are on either side of common arm and sum of angles is 90°.
   (iii) Equal supplementary angles means sum of angles is $180°$ and supplement angles are equal.
   (iv) Unequal supplementary angles means sum of angles is $180°$ and supplement angles are unequal.
   i.e., $\angle AOE, \angle EOC$; $\angle AOD, \angle DOC$ and $\angle AOB, \angle BOC$
   (v) Adjacent angles that do not form a linear pair mean, angles have common ray but the angles in a linear pair are not supplementary.
   i.e., $\angle AOB, \angle AOE$; $\angle AOE, \angle EOD$ and $\angle EOD, \angle COD$

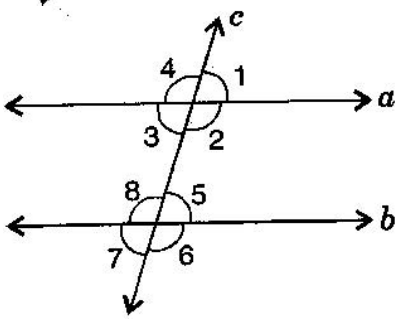
Class –VII Mathematics (Ex. 5.2)
Questions

1. State the property that is used in each of the following statements:
   (i) If $a \parallel b$, then $\angle 1 = \angle 5$.
   (ii) If $\angle 4 = \angle 6$, then $a \parallel b$.
   (iii) If $\angle 4 + \angle 5 + 180°$, then $a \parallel b$.

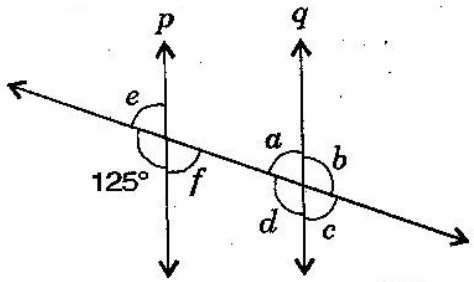


b.

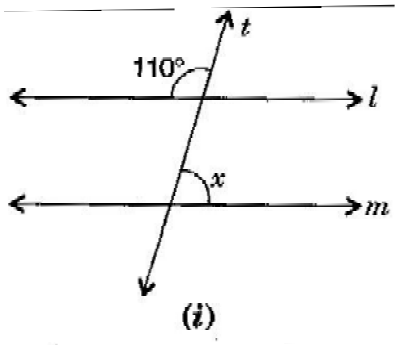
2. In the adjoining figure, identify:
   (i) the pairs of corresponding angles.
   (ii) the pairs of alternate interior angles.
   (iii) the pairs of interior angles on the same side of the transversal.
   (iv) the vertically opposite angles.



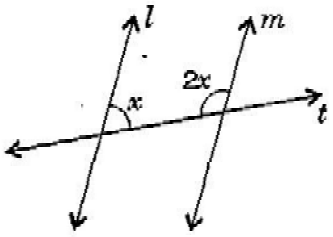
3. In the adjoining figure, $p \parallel q$. Find the unknown angles.



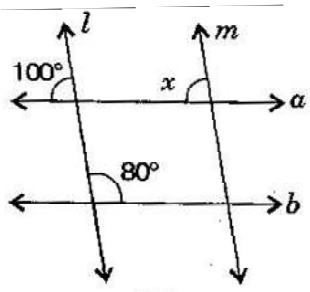
4. Find the values of x in each of the following figures if $l \parallel m$.



(i)

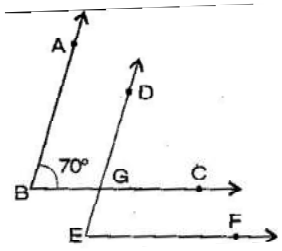


(ii)

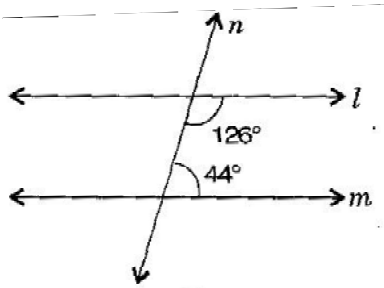


(iii)

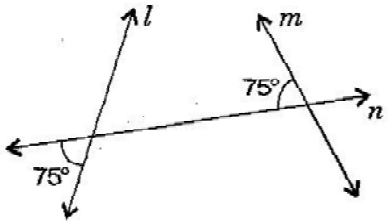
5. In the given figure, the arms of two angles are parallel. If $\Delta ABC = 70°$, then find:
   (i) $\angle DGC$ (ii) $\angle DEF$



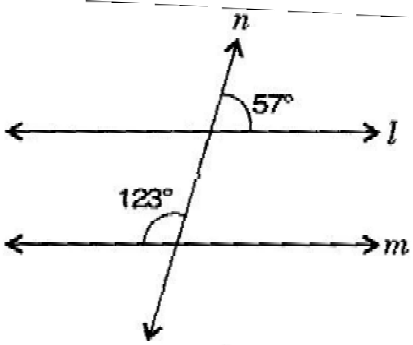
6. In the given figures below, decide whether l is parallel to m.



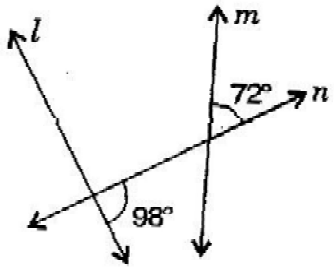
(i)



(ii)



(iii)



(iv)

Class –VII Mathematics (Ex. 5.2)

Answers

1. (i) Given, $a \parallel b$ then $\angle 1 = \angle 5$ [Corresponding angles]

If two parallel lines are cut by a transversal, each pair of corresponding angles are equal in measure.

(ii) Given, $\angle 4 = \angle 6$, then $a \parallel b$ [Alternate interior angles]

When a transversal cuts two lines such that pairs of alternate interior angles are equal, the lines have to be parallel.

(iii) Given, $\angle 4 + \angle 5 = 180°$, then $a \parallel b$ [

When a transversal cuts two lines, such that pairs of interior angles on the same side of transversal are supplementary, the lines have to be parallel.

2. (i) The pairs of corresponding angles:

$\angle 1, \angle 5$; $\angle 2, \angle 6$; $\angle 4, \angle 8$ and $\angle 3, \angle 7$

(ii) The pairs of alternate interior angles are:

$\angle 3, \angle 5$ and $\angle 2, \angle 8$

(iii) The pair of interior angles on the same side of the transversal:

$\angle 3, \angle 8$ and $\angle 2, \angle 5$

(iv) The vertically opposite angles are:

$\angle 1, \angle 3$; $\angle 2, \angle 4$; $\angle 6, \angle 8$ and $\angle 5, \angle 7$

3. Given, $p \parallel q$ and cut by a transversal line.

$\because$ $125° + e = 180°$ [Linear pair]

$\therefore$ $e = 180° - 125° = 55°$ .....(i)

Now $e = f = 55°$ [Vertically opposite angles]

Also $a = f = 55°$ [Alternate interior angles]

$a + b = 180°$ [Linear pair]

$\Rightarrow$ $55° + b = 180°$ [From eq. (i)]

$\Rightarrow$ $b = 180° - 55° = 125°$

Now $a = c = 55°$ and $b = d = 125°$ [Vertically opposite angles]

Thus, $a = 55°, b = 125°, c = 55°, d = 125°, e = 55°$ and $f = 55°$.

4. (i) Given, $l \parallel m$ and t is transversal line.

$\therefore$ Interior vertically opposite angle between lines l and $t = 110°$.

$\therefore$ $110° + x = 180°$ [Supplementary angles]

$\Rightarrow$ $x = 180° - 110° = 70°$

(ii) Given, $l \parallel m$ and t is transversal line.

$x + 2x = 180$ [Interior opposite angles]

$\Rightarrow$ $3x = 180°$ $\Rightarrow$ $x = \frac{180°}{3} = 60°$

(iii) Given, $l \parallel m$ and $a \parallel b$.

$x = 100°$ [Corresponding angles]

5. (i) Given, AB || DE and BC is a transversal line and $\angle ABC = 70°$

$\because$ $\angle ABC = \angle DGC$ [Corresponding angles]

$\therefore$ $\angle DGC = 70°$ .....(i)

(ii) Given, BC || EF and DE is a transversal line and $\angle DGC = 70°$

$\because$ $\angle DGC = \angle DEF$ [Corresponding angles]

$\therefore$ $\angle DEF = 70°$ [From eq. (i)]

6. (i) $126° + 44° = 170°$

l is not parallel to m because sum of interior opposite angles should be 180°.

(ii) $75° + 75° = 150°$

l is not parallel to m because sum of angles does not obey the property of parallel lines.

(iii) $57° + 123° = 180°$

l is parallel to m due to supplementary angles property of parallel lines.

(iv) $98° + 72° = 170°$

l is not parallel to m because sum of angles does not obey the property of parallel lines.

NCERT Solutions for Class 7 Maths Chapter 6

The Triangle and its Properties Class 7

Chapter 6 The Triangle and its Properties Exercise 6.1, 6.2, 6.3, 6.4, 6.5 Solutions

Exercise 6.1 : Solutions of Questions on Page Number : **116**

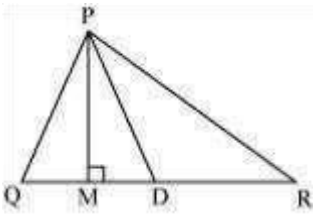
Q1 :

In ΔPQR, D is the mid-point of $\overline{QR}$.

$\overline{PM}$ is _____.

PD is _____.

Is QM = MR?



Answer :

(i) Altitude

(ii) Median

(iii) No

Q2 :

Draw rough sketches for the following:

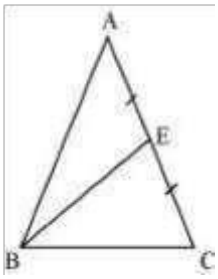
(a) In ΔABC, BE is a median.

(b) In ΔPQR, PQ and PR are altitudes of the triangle.

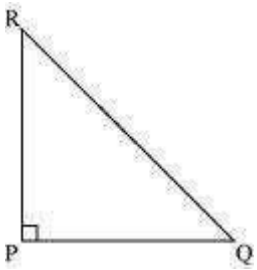
(c) In ΔXYZ, YL is an altitude in the exterior of the triangle.

Answer :

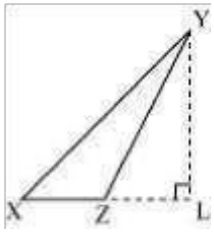
(a)



(b)



(c)

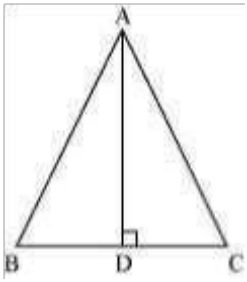


Here, it can be observed that for ΔXYZ, YL is an altitude drawn exterior to side XZ which is extended up to point L.

Q3 :

Verify by drawing a diagram if the median and altitude of an isosceles triangle can be same.

Answer :

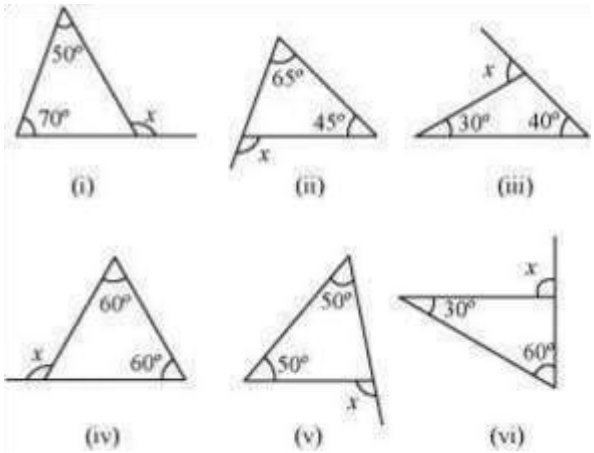


Draw a line segment AD perpendicular to BC. It is an altitude for this triangle. It can be observed that the length of BD and DC is also same. Therefore, AD is also a median of this triangle.

Exercise 6.2 : Solutions of Questions on Page Number : **118**

Q1 :

Find the value of the unknown exterior angle *x* in the following diagrams:



Answer :

(i) $x = 50° + 70°$ (Exterior angle theorem) $x = 120°$

(ii) $x = 65° + 45°$ (Exterior angle theorem)

$= 110°$

(iii) $x = 40° + 30°$ (Exterior angle theorem)

$= 70°$

(iv) $x = 60° + 60°$ (Exterior angle theorem)

$= 120°$

(v) $x = 50° + 50°$ (Exterior angle theorem)

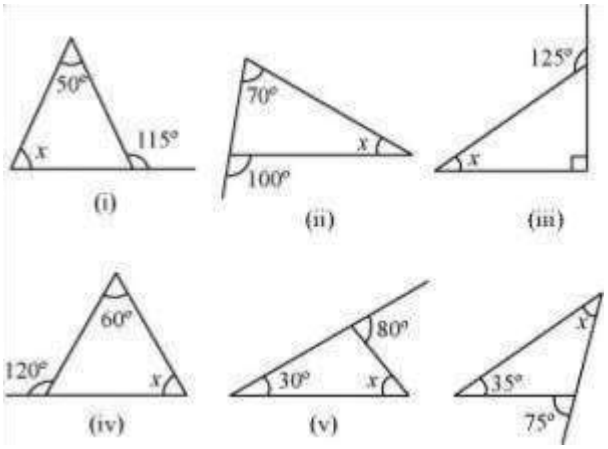
$= 100°$

(vi) $x = 30° + 60°$ (Exterior angle theorem)

$= 90°$

Q2 :

Find the value of the unknown interior angle *x* in the following figures:



Answer :

(i) $x + 50° = 115°$ (Exterior angle theorem)

$x = 115° - 50° = 65°$

(ii) $70° + x = 100°$ (Exterior angle theorem)

$x = 100° - 70° = 30°$

(iii) $x + 90° = 125°$ (Exterior angle theorem)

$x = 125° - 90° = 35°$

(iv) $x + 60° = 120°$ (Exterior angle theorem)

$x = 120° - 60° = 60°$

(v) $x + 30° = 80°$ (Exterior angle theorem)

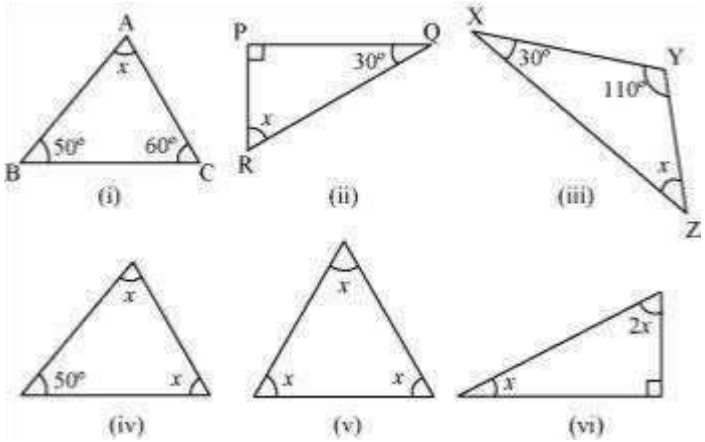
$x = 80° - 30° = 50°$

(vi) $x + 35° = 75°$ (Exterior angle theorem)
$x = 75º - 35º = 40°$

Exercise 6.3 : Solutions of Questions on Page Number : **121**

Q1 :

Find the value of the unknown *x* in the following diagrams:



Answer :

The sum of all interior angles of a triangle is 180°. By using this property, these problems can be solved as follows.

(i) $x + 50° + 60° = 180°$ x

$+ 110° = 180°$ $x = 180° -$

$110° = 70°$ (ii) $x + 90° +$

$30° = 180°$ $x + 120° =$

$180°$ $x = 180° - 120° =$

60° (iii) x + 30° + 110° =

180° x + 140° = 180°
x = 180° - 140° = 40°

(iv) 50° + x + x = 180°

50° + 2x = 180°

2x = 180° - 50° = 130°

$$x = \frac{130^\circ}{2} = 65^\circ$$

(v) x + x + x = 180°

3x = 180°

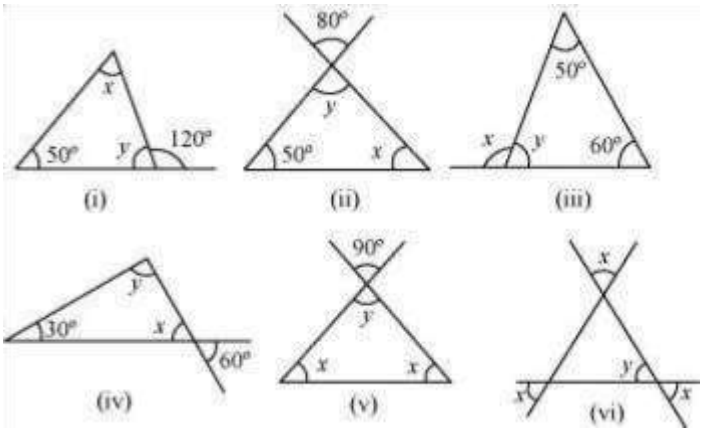
$$x = \frac{180}{3} = 60^\circ$$

(vi) x + 2x + 90° = 180°

3x = 180° - 90° = 90 º

$$x = \frac{90^\circ}{3} = 30^\circ$$

Q2 :
Find the value of the unknowns *x* and *y* in the following diagrams:



Answer :

(i) y + 120° = 180° (Linear pair) y

= 180° - 120 º = 60 º x + y + 50° = 180°

(Angle sum property) x + 60° + 50° =

180° x + 110° = 180° x = 180° - 110° =

70°

(ii) y = 80° (Vertically opposite angles) y

+ x + 50° = 180° (Angle sum

property)

80° + x + 50° = 180° x

+ 130 º = 180° x =

180° - 130 º = 50°

(iii) y + 50° + 60° = 180° (Angle sum property) y = 180° - 60° - 50° = 70° x + y = 180°

(Linear pair) x = 180° - y = 180° - 70° = 110°

(iv) x = 60 º (Vertically opposite angles)

30° + x + y = 180° 30° + 60° + y =

180° y = 180° - 30° - 60° = 90° (v) y =

90° (Vertically opposite angles) x + x +

y = 180° (Angle sum property)

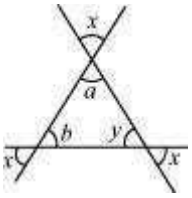
2x + y = 180° 2x +

90° = 180°

2x = 180° - 90° = 90°

$$x = \frac{90^\circ}{2} = 45^\circ$$

(vi)



y = x (Vertically opposite angles) a = x

(Vertically opposite angles) b = x

(Vertically opposite angles) a + b + y

= 180° (Angle sum property) x + x + x

= 180°

3x = 180°

$$x = \frac{180^\circ}{3} = 60^\circ$$

y = x = 60°

Exercise 6.4 : Solutions of Questions on Page Number : **126**

Q1 :
Is it possible to have a triangle with the following sides?

(i) 2 cm, 3 cm, 5 cm (ii) 3 cm, 6 cm, 7 cm

(iii) 6 cm, 3 cm, 2 cm

Answer :

In a triangle, the sum of the lengths of either two sides is always greater than the third side.

(i) Given that, the sides of the triangle are 2 cm, 3 cm, 5 cm.

It can be observed that,

2 + 3 = 5 cm

However, 5 cm = 5 cm

Hence, this triangle is not possible.

(ii) Given that, the sides of the triangle are 3 cm, 6 cm, 7 cm.

Here, 3 + 6 = 9 cm > 7 cm

6 + 7 = 13 cm > 3 cm 3 +

7 = 10 cm > 6 cm

Hence, this triangle is possible.

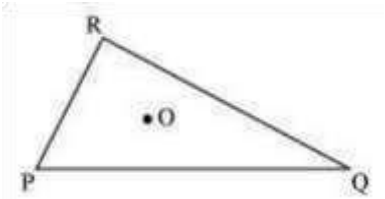
(iii) Given that, the sides of the triangle are 6 cm, 3 cm, 2 cm.

Here, 6 + 3 = 9 cm > 2 cm

However, 3 + 2 = 5 cm < 6 cm Hence, this triangle is not possible.

Q2 :

Take any point O in the interior of a triangle PQR. Is



(i) OP + OQ > PQ?

(ii) OQ + OR > QR?

(iii) OR + OP > RP?

Answer :

If O is a point in the interior of a given triangle, then three triangles ΔOPQ, ΔOQR, and ΔORP can be constructed. In a triangle, the sum of the lengths of either two sides is always greater than the third side.

(i) Yes, as ΔOPQ is a triangle with sides OP, OQ, and PQ.

OP + OQ > PQ

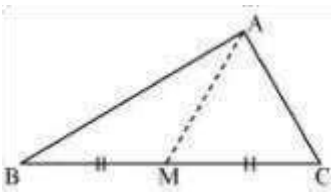
(ii) Yes, as ΔOQR is a triangle with sides OR, OQ, and QR.

OQ + OR > QR

(iii) Yes, as ΔORP is a triangle with sides OR, OP, and PR. OR + OP > PR

Q3 :

AM is a median of a triangle ABC. Is AB + BC + CA > 2 AM? (Consider the sides of triangles ΔABM and ΔAMC.)



Answer :

In a triangle, the sum of the lengths of either two sides is always greater than the third side.

In ΔABM,

AB + BM > AM (*i*)

Similarly, in ΔACM,

AC + CM > AM (*ii*)

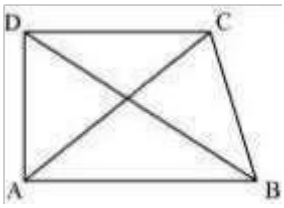
Adding equation (*i*) and (*ii*),

AB + BM + MC + AC > AM + AM

AB + BC + AC > 2AM Yes, the given expression is true.

Q4 :
ABCD is quadrilateral.

Is AB + BC + CD + DA >AC + BD?



Answer :

In a triangle, the sum of the lengths of either two sides is always greater than the third side.

Considering ΔABC,

AB + BC > CA (*i*)

In ΔBCD,

BC + CD > DB (*ii*)

In ΔCDA,

CD + DA > AC (*iii*)

In ΔDAB,

DA + AB > DB (*iv*)

Adding equations (*i*), (*ii*), (*iii*), and (*iv*), we obtain

AB + BC + BC + CD + CD + DA + DA + AB > AC + BD + AC + BD
2AB + 2BC + 2CD +2DA > 2AC + 2BD

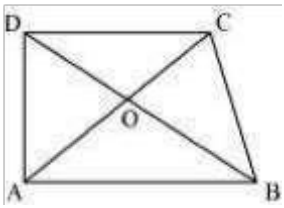
2(AB + BC + CD + DA) > 2(AC + BD)

(AB + BC + CD + DA) > (AC + BD) Yes, the
given expression is true.

Q5 :
ABCD is quadrilateral.

Is AB + BC + CD + DA < 2 (AC + BD)?

Answer :



In a triangle, the sum of the lengths of either two sides is always greater than the third side.

Considering ΔOAB,

OA + OB > AB (*i*)

In ΔOBC,

OB + OC > BC (*ii*)

In ΔOCD,

OC + OD > CD (*iii*)

In ΔODA,

OD + OA > DA (*iv*)

Adding equations (*i*), (*ii*), (*iii*), and (*iv*), we obtain

OA + OB + OB + OC + OC + OD + OD + OA > AB + BC + CD + DA

2OA + 2OB + 2OC + 2OD > AB + BC + CD + DA

2OA + 2OC + 2OB + 2OD > AB + BC + CD + DA

2(OA + OC) + 2(OB + OD) > AB + BC + CD + DA

2(AC) + 2(BD) > AB + BC + CD + DA

2(AC + BD) > AB + BC + CD + DA Yes,
the given expression is true.

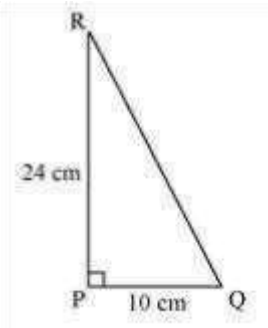
Q6 :
The lengths of two sides of a triangle are 12 cm and 15 cm. Between what two measures should the length of the third side fall?

Answer :
In a triangle, the sum of the lengths of either two sides is always greater than the third side and also, the difference of the lengths of either two sides is always lesser than the third side. Here, the third side will be lesser than the sum of these two (i.e., 12 + 15 = 27) and also, it will be greater than the difference of these two (i.e., 15 - 12 = 3). Therefore, those two measures are 27cm and 3 cm.

Exercise 6.5 : Solutions of Questions on Page Number : **130**

Q1 :
PQR is a triangle right angled at P. If PQ = 10 cm and PR = 24 cm, find QR.

Answer :



By applying Pythagoras theorem in ΔPQR,

$(PQ)^2 + (PR)^2 = (RQ)^2$

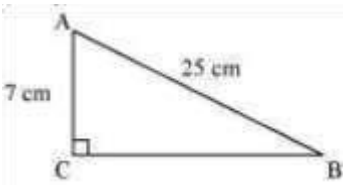
$(10)^2 + (24)^2 = RQ^2$

$100 + 576 = (QR)^2$

$676 = (QR)^2$ QR
= 26 cm

Q2 :
ABC is a triangle right angled at C. If AB = 25 cm and AC = 7 cm, find BC.

Answer :



By applying Pythagoras theorem in ΔABC,

$(AC)^2 + (BC)^2 = (AB)^2$

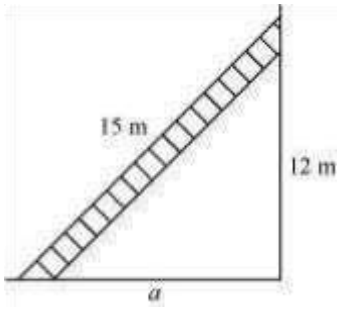
$(BC)^2 = (AB)^2 - (AC)^2$

$(BC)^2 = (25)^2 - (7)^2$

$(BC)^2 = 625 - 49 = 576$

BC = 24 cm

Q3 :
A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance *a*. Find the distance of the foot of the ladder from the wall.



Answer :

By applying Pythagoras theorem,

$(15)^2 = (12)^2 + a^2$

$225 = 144 + a^2$ $a^2 =$

$225 - 144 = 81$ $a = 9$

m

Therefore, the distance of the foot of the ladder from the wall is 9 m.

Q4 :
Which of the following can be the sides of a right triangle?

(i) 2.5 cm, 6.5 cm, 6 cm

(ii) 2 cm, 2 cm, 5 cm

(iii) 1.5 cm, 2 cm, 2.5 cm

In the case of right-angled triangles, identify the right angles.

Answer :

(i) 2.5 cm, 6.5 cm, 6 cm

$(2.5)^2 = 6.25$

$(6.5)^2 = 42.25$

$(6)^2 = 36$

It can be observed that,

36 + 6.25 = 42.25

$(6)^2 + (2.5)^2 = (6.5)^2$

The square of the length of one side is the sum of the squares of the lengths of the remaining two sides. Hence, these are the sides of a right-angled triangle. Right angle will be in front of the side of 6.5 cm measure. (ii) 2 cm, 2 cm, 5 cm

$(2)^2 = 4$

$(2)^2 = 4$

$(5)^2 = 25$
Here, $(2)^2 + (2)^2 \neq (5)^2$
The square of the length of one side is not equal to the sum of the squares of the lengths of the remaining two sides. Hence, these sides are not of a right-angled triangle.

(iii) 1.5 cm, 2 cm, 2.5 cm

$(1.5)^2 = 2.25$

$(2)^2 = 4$

$(2.5)^2 = 6.25$

Here,

2.25 + 4 = 6.25

$(1.5)^2 + (2)^2 = (2.5)^2$

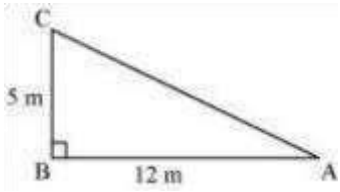
The square of the length of one side is the sum of the squares of the lengths of the remaining two sides. Hence, these are the sides of a right-angled triangle.

Right angle will be in front of the side of 2.5 cm measure.

Q5 :

A tree is broken at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the tree. Find the original height of the tree.

Answer :



In the given figure, BC represents the unbroken part of the tree. Point C represents the point where the tree broke and CA represents the broken part of the tree. Triangle ABC, thus formed, is right-angled at B.

Applying Pythagoras theorem in ΔABC,

$AC^2 = BC^2 + AB^2$

$AC^2 = (5\ m)^2 + (12\ m)^2$

$AC^2 = 25\ m^2 + 144\ m^2 = 169\ m^2$

AC = 13 m

Thus, original height of the tree = AC + CB = 13 m + 5 m = 18 m

Q6 :

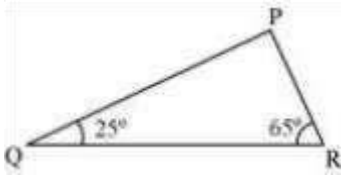
Angles Q and R of a ΔPQR are 25° and 65°.

Write which of the following is true:

(i) $PQ^2 + QR^2 = RP^2$

(ii) $PQ^2 + RP^2 = QR^2$

(iii) $RP^2 + QR^2 = PQ^2$



Answer :

The sum of the measures of all interior angles of a triangle is 180º.

$\angle PQR + \angle PRQ + \angle QPR = 180^\circ$

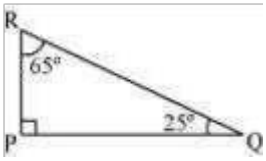
$25^\circ + 65^\circ + \angle QPR = 180^\circ$

$90^\circ + \angle QPR = 180^\circ$

$\angle QPR = 180^\circ - 90^\circ = 90^\circ$

Therefore, Δ PQR is right-angled at point P.

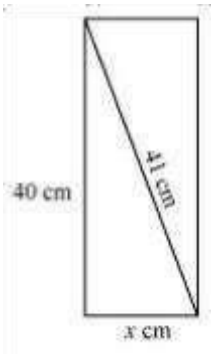
Hence, $(PR)^2 + (PQ)^2 = (QR)^2$



Thus, (ii) is true.

Q7 :
Find the perimeter of the rectangle whose length is 40 cm and a diagonal is 41 cm.

Answer :



In a rectangle, all interior angles are of 90º measure. Therefore, Pythagoras theorem can be applied here.

$(41)^2 = (40)^2 + x^2$ 1681

$= 1600 + x^2$ $x^2 = 1681$

1600 = 81 x = 9 cm

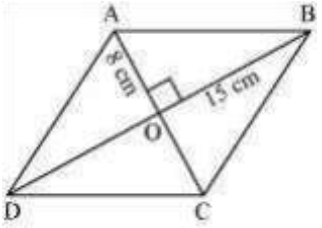
Perimeter = 2(Length + Breadth)

$= 2(x + 40)$

$= 2 (9 + 40)$
$= 98$ cm

Q8 :
The diagonals of a rhombus measure 16 cm and 30 cm. Find its perimeter.

Answer :



Let ABCD be a rhombus (all sides are of equal length) and its diagonals, AC and BD, are intersecting each other at point O. Diagonals in a rhombus bisect each other at 90 º. It can be observed that

$$AO = \frac{AC}{2} = \frac{16}{2} = 8 \text{ cm}$$

$$BO = \frac{BD}{2} = \frac{30}{2} = 15 \text{ cm}$$

By applying Pythagoras theorem in ΔAOB,

$OA^2 + OB^2 = AB^2$

$8^2 + 15^2 = AB^2$

$64 + 225 = AB^2$

$289 = AB^2$

$AB = 17$

Therefore, the length of the side of rhombus is 17 cm.

Perimeter of rhombus = 4 × Side of the rhombus = 4 × 17 = 68 cm

DELHI PUBLIC SCHOOL – GANDHINAGAR

CHAPTER 06 TRIANGLE AND ITS PROPERTIES

MIND MAP

This chapter consists of six different topics. The most probable questions from examination point of view are given below.

TYPE: 1 FINDING MEDIAN AND ALTITUDE OF A TRIANGLE

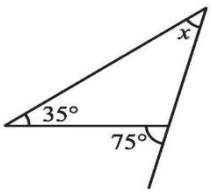
Q.1 Name a triangle in which altitude is equal to the median.

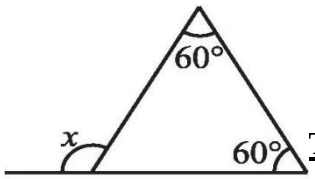
Q.2 Draw a triangle in which altitude is outside the triangle.

Q.3 Name a triangle in which its two altitudes becomes two sides of triangle.

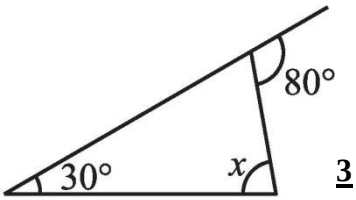
TYPE: 2 QUESTIONS BASED ON EXTERIOR ANGLE PROPERTY OF A TRIANGLE.

Q.1 Find the value of unknown for given figures.

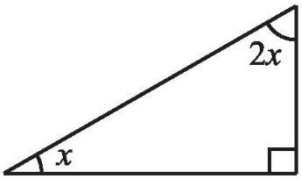


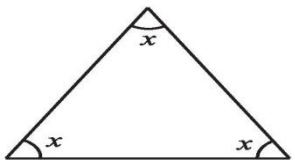


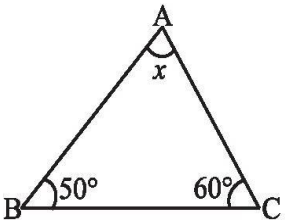
TYPE: 3 QUESTIONS BASED ON ANGLE SUM PROPERTY OF A TRIANGLE.



Q. 1 Find the value of unknown for given figures.



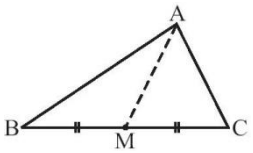




TYPE: 4 QUESTIONS BASED ON PROPERTY OF TRIANGLE. (SUM OF LENGTHS OF TWO SIDES OF A TRIANGLE IS GREATER THAN THE THIRD SIDE).

Q.1 The lengths of two sides of a triangle are 6 cm and 8 cm, between which two numbers can length of the third side fall?

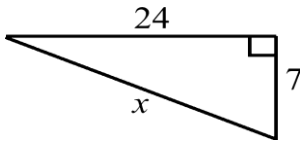
Q.2 AM is a median of a triangle ABC. Is AB + BC + CA > 2 AM?



Q.3 Is there a triangle whose sides have lengths 10.2 cm, 5.8 cm and 4.5 cm?

TYPE: 5 QUESTIONS BASED ON PROERTY OF A RIGHT ANGLED TRIANGLE (PYTHAGORAS PROPERTY)

Q.1 Find the value of unknown for the adjoining figure:



.

TYPE: 6 QUESTIONS BASED ON APPLICATION OF PYTHAGORAS PROPERTY.

Q.1. A 15 m long ladder reached a window 12 m high from the ground on placing it against a wall at a distance *a*. Find the distance of the foot of the ladder from the wall.

Q.2. A tree is broken at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the tree. Find the original height of the tree.

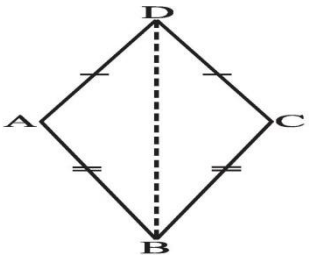
DELHI PUBLIC SCHOOL, GANDHINAGAR

CHAPTER – 7 CONGRUENCE OF TRIANGLES

MIND MAP

This chapter consists of four different topics. The most probable questions from examination point of view are given below.

TYPE: 1 SSS CONGRUENCE CONDITION OF TRIANGLES.



Q.1 In Fig AD = CD and AB = CB.

(i) State the three pairs of equal parts in ΔABD and ΔCBD.

(ii) Is $\Delta ABD \cong \Delta CBD$? Why or why not?

(iii) Does BD bisect $\angle ABC$? Give reasons.

Q.2 In Δ ABC and Δ PQR, AB=4cm, BC=5 cm, AC=6 cm and PQ=4cm, QR=5 cm, PR=6 cm, then which of the following is true-

(a) Δ ABC $\cong$ Δ QRP (c) Δ ABC $\cong$ Δ PQR

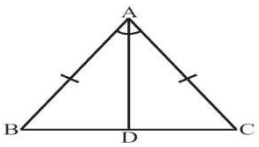
(c) Δ ABC $\cong$ Δ PRQ (d) Δ ABC $\cong$ Δ QPR

TYPE: 2. SAS CONGRUENCE CONDITION OF TRIANGLES.

Q.1 In triangles ABC and DEF, AB = 7 cm, BC = 5 cm, $\angle B = 50°$ DE = 5 cm, EF = 7 cm, $\angle E = 50°$ By which congruence rule the triangles are congruent?

(a) SAS (b) RHS (c) ASA (d) SSS

Q.2 In the above sided Fig, AB = AC and AD is the bisector of $\angle BAC$.



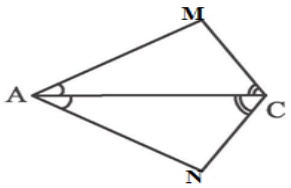
(i) State three pairs of equal parts in triangles ADB and ADC.

(ii) Is $\Delta ADB \cong \Delta ADC$? Give reasons.

(iii) Is BD = DC? Give reasons.

TYPE : 3 ASA CONGRUENCE CONDITION OF TRIANGLES.

Q.1 In the above sided Fig, AC bisects $\angle MAN$ as well as $\angle MCN$.



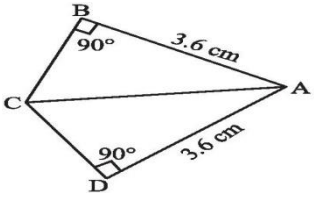
(i) State the three pairs of equal parts in triangles NAC and MAC.

(ii) Is $\Delta NAC \cong \Delta MAC$? Give reasons.

(iii) Is AN = AM? Justify your answer.

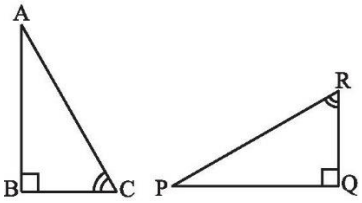
TYPE : 4 RHS CONGRUENCE CONDITION OF TRIANGLES.

Q.1. In the adjoining figure, by which congruence rule the triangles are congruent?



(a) SAS (b) RHS (c) ASA (d) SSS

Q.2. If ΔABC and ΔPQR are to be congruent, name one additional pair of corresponding parts. What criterion did you use?



NCERT Solutions for Class 7 Maths Chapter 7

Congruence of Triangles Class 7

Chapter 7 Congruence of Triangles Exercise 7.1, 7.2 Solutions

Exercise 7.1 : Solutions of Questions on Page Number : **137**

Q1 :

Complete the following statements:

(a) Two line segments are congruent if _____.

(b) Among two congruent angles, one has a measure of 70°; the measure of the other angle is _____.

(c) When we write ∠A = ∠B, we actually mean _____.

Answer :

(a) They have the same length

(b) 70°

(c) m ∠A = m ∠B

Q2 :

Give any two real-life examples for congruent shapes.

Answer :

(i) Sheets of same letter pad (ii)
Biscuits in the same packet

Q3 :

If ΔABC ≅ ΔFED under the correspondence ABC Ã¢â€ â€ FED, write all the Corresponding congruent parts of the triangles.

Answer :

If these triangles are congruent, then the corresponding angles and sides will be equal to each other.

∠A ↔ ∠F

∠B ↔ ∠E

∠C ↔ ∠D

$\overline{AB} \leftrightarrow \overline{FE}$

$\overline{BC} \leftrightarrow \overline{ED}$

$\overline{CA} \leftrightarrow \overline{DF}$

Q4 :
If ΔDEF ≅ ΔBCA, write the part(s) of ΔBCA that correspond to

(i) ∠E (ii) $\overline{EF}$ **(iii) ∠F (iv)** $\overline{DF}$

Answer :

(i) ∠C

$\overline{CA}$ (ii)

(iii) ∠A

$\overline{BA}$ (iv)

Exercise 7.2 : Solutions of Questions on Page Number : **149**

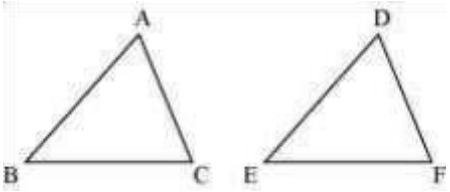
Q1 :
Which congruence criterion do you use in the following?

(a) Given: AC = DF

AB = DE

BC = EF

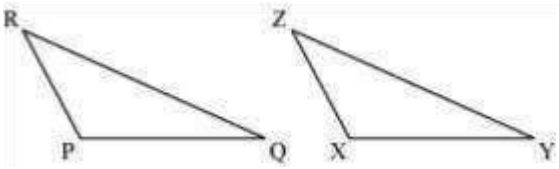
So, ΔABC ≅ ΔDEF



(b) Given: ZX = RP
RQ = ZY

∠PRQ = ∠XZY

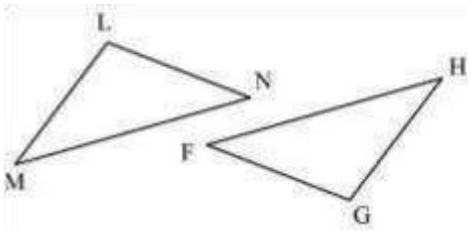
So, ΔPQR ≅ ΔXYZ



(c) Given: ∠ MLN = ∠FGH ∠NML = ∠GFH

ML = FG

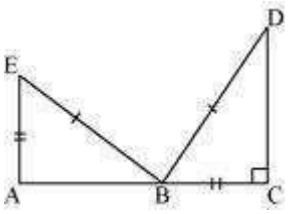
So, ΔLMN ≅ ΔGFH



(d) Given: EB = DB AE = BC

∠A = ∠C = 90°

So, ΔABE ≅ ΔCDB



Answer :

(a) SSS, as the sides of ΔABC are equal to the sides of ΔDEF.

(b) SAS, as two sides and the angle included between these sides of ΔPQR are equal to two sides and the angle included between these sides of ΔXYZ. (c) ASA, as two angles and the side included between these angles of ΔLMN are equal to two angles and the side included between these angles of ΔGFH.

(d) RHS, as in the given two right-angled triangles, one side and the hypotenuse are respectively equal.

Q2 :

You want to show that ΔART ≅ ΔPEN,

(a) If you have to use SSS criterion, then you need to show

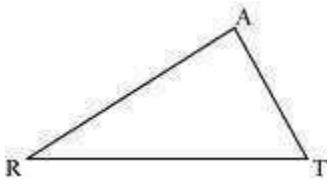
(i) AR = (ii) RT = (iii) AT =

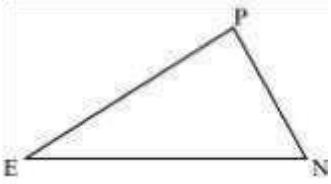
(b) If it is given that ∠T = ∠N and you are to use SAS criterion, you need to have

(i) RT = and (ii) PN =

(c) If it is given that AT = PN and you are to use ASA criterion, you need to have

(i) ? (ii) ?





Answer :
(a)
(i) AR = PE

(ii) RT = EN

(iii) AT = PN

(b)

(i) RT = EN

(ii) PN = AT

(c)

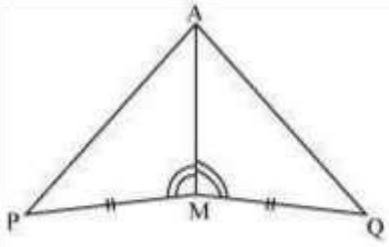
(i) $\angle ATR = \angle PNE$ (ii) $\angle RAT = \angle EPN$

Q3 :

You have to show that ΔAMP ≅ AMQ.

In the following proof, supply the missing reasons.

-	Steps	-	Reasons
(i)	PM = QM	(i)	…
(ii)	∠PMA = ∠QMA	(ii)	…
(iii)	AM = AM	(iii)	…
(iv)	ΔAMP ≅ ΔAMQ	(iv)	…



Answer :

(i) Given

(ii) Given

(iii) Common

(iv) SAS, as the two sides and the angle included between these sides of ΔAMP are equal to two sides and the angle included between these sides of ΔAMQ.

Q4 :

In $\triangle ABC$, $\angle A = 30°$, $\angle B = 40°$ and $\angle C = 110°$

In $\triangle PQR$, $\angle P = 30°$, $\angle Q = 40°$ and $\angle R = 110°$ A student says that ΔABC ≅ ΔPQR by AAA congruence criterion. Is he justified? Why or why not?

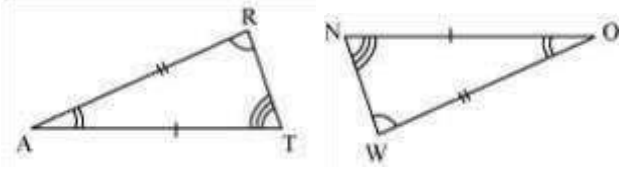
Answer :

No. This property represents that these triangles have their respective angles of equal measure. However, this gives no information about their sides. The sides of these triangles have a ratio somewhat different than 1:1. Therefore, AAA property does not prove the two triangles congruent.

Q5 :

In the figure, the two triangles are congruent.

The corresponding parts are marked. We can write ΔRAT ?



≅

Answer :

It can be observed that,

∠RAT = ∠WON

∠ART = ∠OWN AR
= OW

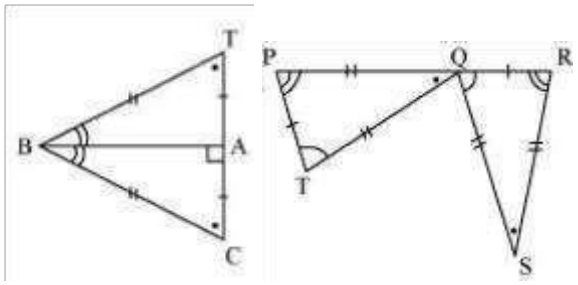
Therefore, ΔRAT ≅ ΔWON, by ASA criterion.

Q6 :

Complete the congruence statement:

ΔBCA ≅?

ΔQRS ?



≅

Answer :

Given that, BC = BT

TA = CA

BA is common.

Therefore, ΔBCA ≅ ΔBTA

Similarly, PQ = RS
TQ = QS PT
= RQ

Therefore, ΔQRS ≅ ΔTPQ

Q7 :

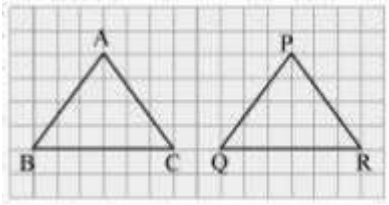
In a squared sheet, draw two triangles of equal areas such that (i) The triangles are congruent.

(ii) The triangles are not congruent.

What can you say about their perimeters?

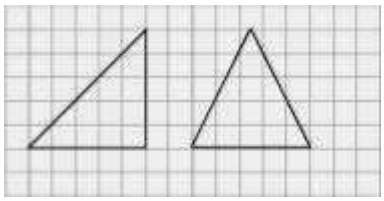
Answer :

(i)



Here, ΔABC and ΔPQR have the same area and are congruent to each other also. Also, the perimeter of both the triangles will be the same.

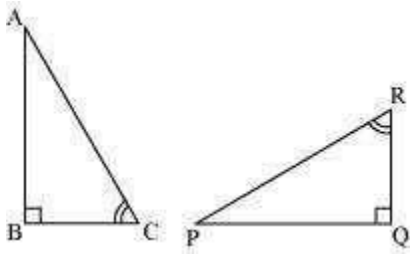
(ii)



Here, the two triangles have the same height and base. Thus, their areas are equal. However, these triangles are not congruent to each other. Also, the perimeter of both the triangles will not be the same.

Q8 :

If ΔABC and ΔPQR are to be congruent, name one additional pair of corresponding parts. What criterion did you use?



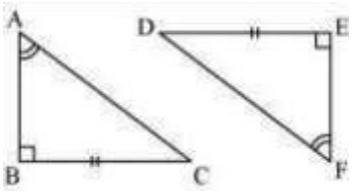
Answer :

BC = QR

ΔABC $\cong$ ΔPQR (ASA criterion)

Q9 : Explain, why

ΔABC ≅ ΔFED



Answer :

Given that, ∠ABC = ∠FED (1) ∠BAC = ∠EFD (2)

The two angles of ΔABC are equal to the two respective angles of ΔFED. Also, the sum of all interior angles of a triangle is 180º.

Therefore, third angle of both triangles will also be equal in measure. ∠BCA = ∠EDF (3)

Also, given that, BC = ED (4)

By using equation (1), (3), and (4), we obtain

ΔABC ≅ ΔFED (ASA criterion)

DELHI PUBLIC SCHOOL, GANDHINAGAR

CHAPTER 12 ALGEBRAIC EXPRESSIONS

MIND MAP

This chapter consists of six different topics. The most probable questions from examination point of view are given below.

TYPE: 1 LIST THE FACTORS OF THE GIVEN TERMS.

Q.1 $4p^2q$

Q.2 $-15xy^2$

TYPE: 2 FIND THE TERMS CONTAINING (x) AND WRITE THE COFFICIENT OF (x) .

Q.1 $76x + 67\ y^2xz^5$

Q.2 $32yx + 6$

Q.3 $2px - 7nm$

TYPE: 3 CLASSIFY THE FOLLOWING AS MONOMIALS, BINOMIALS, AND TRINOMIALS.

Q.1. $70x$

Q.2. $\frac{4}{6}q + 16$

Q.3. $3n - 22x + 7$

TYPE: PICK OUT THE LIKE TERMS FROM THE FOLLOWING GROUPS.

Q.1. 10pq, 7p, 8q, $-p^2q^2$, -7pq, -23, ab, 3q, 5b.

Q.2. 7xy, 5yz, – 3zx, 4yz, 9zx, – 4y, –3xz, 5x, – 2xy.

TYPE: 5 ADD THE FOLLOWING EXPRESSIONS.

Q.1. 7mn + 5, 12mn + 2, 9mn – 8, – 2mn – 3

Q.2. 14x + 10y – 12xy – 13, 18 – 7x – 10y + 8xy, 4xy

TYPE: 6 SUBTRACT THE FOLLOWINF EXPRESSIONS.

Q.1. 7mn – 5, 12mn +42, 9mn – 18, – 2mn – 3

Q.2. 4x + 10y – 2xy – 13, 18 – 7x – 10y + 18xy, 14xy

NCERT Solutions for Class 7 Maths Chapter 12

Algebraic Expressions Class 7

Chapter 12 Algebraic Expressions Exercise 12.1, 12.2, 12.3, 12.4 Solutions

Exercise 12.1 : Solutions of Questions on Page Number : **234**

Q1 :

Get the algebraicexpressions in the following cases using variables, constants and arithmetic operations.

(i) Subtraction of *z* from *y*.

(ii) One-half of the sum of numbers *x* and *y*.

(iii) The number *z* multiplied by itself.

(iv) One-fourth of the product of numbers *p* and *q*.

(v) Numbers *x* and *y* both squared and added.

(vi) Number 5 added to three times the product of number *m* and *n*.

(vii) Product of numbers *y* and *z* subtracted from 10.

(viii)Sum of numbers *a* and *b* subtracted from their product.

Answer :

(i) $y - z$

(ii) $\frac{1}{2}(x+y)$

(iii) z^2

(iv) $\frac{1}{4}(pq)$

(v) $x^2 + y^2$

(vi) $5 + 3(mn)$

(vii) $10 - yz$ (viii) $ab - (a + b)$

Q2 :

(i) Identify the terms and their factors in the following expressions Show the terms and factors by tree diagrams.

(a) $x - 3$ **(b)** $1 + x + x^2$ **(c)** $y - y^3$

(d) $5xy^2 + 7x^2y$ **(e)** $-ab + 2b^2 - 3a^2$

(ii) Identify terms and factors in the expressions given below:

(a) $-4x + 5$ **(b)** $-4x + 5y$ **(c)** $5y + 3y^2$

(d) $xy + 2x^2y^2$ **(e)** $pq + q$

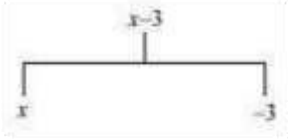
(f) $1.2ab - 2.4b + 3.6a$ **(g)** $\frac{3}{4}x + \frac{1}{4}$

(h) $0.1p^2 + 0.2q^2$

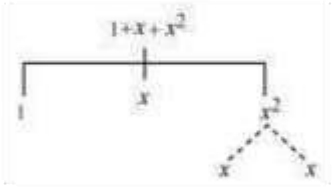
Answer :

(i)

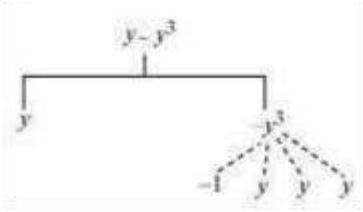
(a)



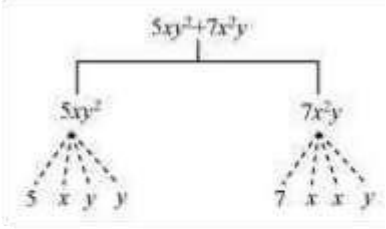
(b)



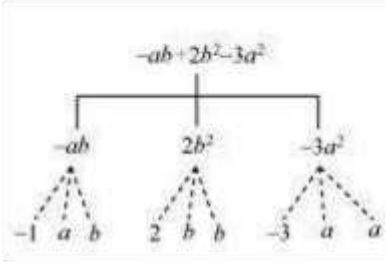
(c)



(d)



(e)



(ii)

(a)	$-4x+5$	$-4x$ 5	$-4, x$ 5
(b)	$-4x+5y$	$-4x$ $5y$	$-4, x$ $5, y$
(c)	$5y+3y^2$	$5y$ $3y^2$	$5, y$ $3, y, y$
(d)	$xy+2x^2y^2$	xy $2x^2y^2$	x, y $2, x, x, y, y$
(e)	$pq+q$	pq q	p, q q
(f)	$1.2ab-2.4b+3.6a$	$1.2ab$ $-2.4b$ $3.6a$	$1.2, a, b$ $-2.4, b$ $3.6, a$
(g)	$\frac{3}{4}x+\frac{1}{4}$	$\frac{3}{4}x$ $\frac{1}{4}$	$\frac{3}{4}, x$ $\frac{1}{4}$
(h)	$0.1p^2+0.2q^2$	$0.1p^2$ $0.2q^2$	$0.1, p, p$ $0.2, q, q$

Row	Expression	Terms	Factors

Q3 : **xpressions:**

Identify the numerical coefficients of terms (other than constants) in the following e (i) $5-3t^2$ (ii) $1+t+t^2+t^3$ (iii) $x+2xy+3y$

(iv) $100m+1000n$ (v) $-p^2q^2+7pq$ (vi) $1.2a+0.8b$

(vii) $3.14r^2$ (viii) $2(l+b)$ (ix) $0.1y+0.01y^2$

Answer :

Row	Expression	Terms	Coefficients
(i)	$5-3t^2$	$-3t^2$	-3

(iii)	$x + 2xy + 3y$	x $2xy$ $3y$	1 2 3
(iv)	$100m + 1000n$	$100m$ $1000n$	100 1000
(v)	$-p^2q^2 + 7pq$	$-p^2q^2$ $7pq$	- 1 7
(vi)	$1.2a + 0.8b$	$1.2a$ $0.8b$	1.2 0.8
(vii)	$3.14\ r^2$	$3.14\ r^2$	3.14
(viii)	$2(l + b)$	$2l$ $2b$	2 2
(ix)	$0.1y + 0.01y^2$	$0.1y$ $0.01y^2$	0.1 0.01

(ii)	$1 + t + t^2 + t^3$	t t^2 t^3	1 1 1

Q4 :

(a) Identify terms which contain *x* and give the coefficient of *x*.

(i) $y^2x + y$ (ii) $13y^2 - 8yx$ (iii) $x + y + 2$

(iv) $5 + z + zx$ (v) $1 + x + xy$ (vi) $12xy^2 + 25$

(vii) $7x + xy^2$

(b) Identify terms which contain y^2 and give the coefficient of y^2.

(i) $8 - xy^2$ (ii) $5y^2 + 7x$ (iii) $2x^2y - 15xy^2 + 7y^2$

Answer :

(a)

Row	Expression	Terms with *x*	Coefficient of *x*
(i)	$y^2x + y$	y^2x	y^2
(ii)	$13y^2 - 8yx$	$-8yx$	$-8y$
(iii)	$x + y + 2$	x	1
(iv)	$5 + z + zx$	zx	z

Row	Expression	Terms with y^n	Coefficient of y^n
(i)	$8 - xy^n$	$- xy^n$	$- x$
(ii)	$5y^n + 7x$	$5y^n$	5
(iii)	$2x^2y + 7y^n - 15xy^n$	$7y^n - 15xy^n$	$7 - 15x$
(v)	$1 + x + xy$	$x\ xy$	$1\ y$
(vi)	$12xy^2 + 25$	$12xy^2$	$12y^2$
(vii)	$7x + xy^2$	$7x\ xy^2$	$7\ y^2$

(b)

Q5 :
Classify into monomials, binomials and trinomials.

(i) $4y - 7z$ (ii) y^2 (iii) $x + y - xy$

(iv) 100 (v) $ab - a - b$ (vi) 5 - 3t

(vii) $4p^2q - 4pq^2$ (viii) $7mn$ (ix) $z^2 - 3z + 8$

(x) $a^2 + b^2$ (xi) $z^2 + z$ (xii) $1 + x + x^2$

Answer :

The monomials, binomials, and trinomials have 1, 2, and 3 unlike terms in it respectively.

(i) $4y - 7z$

Binomial

(ii) y^2

Monomial

(iii) $x + y - xy$

Trinomial

(iv) 100

Monomial

(v) $ab - a - b$

Trinomial

(vi) $5 - 3t$

Binomial

(vii) $4p^2q - 4pq^2$
Binomial

(viii) $7mn$

Monomial

(ix) $z^2 - 3z + 8$

Trinomial

(x) $a^2 + b^2$

Binomial

(xi) $z^2 + z$

Binomial

(xii) $1 + x + x^2$

Trinomial

Q6 :
State whether a given pair of terms is of like or unlike terms.

(i) 1, 100 (ii) $-7x, \frac{5}{2}x$ **(iii) - 29*x*, - 29*y***

(iv) 14*xy*, 42*yx* (v) $4m^2p$, $4mp^2$ (vi) 12*xz*, 12 x^2z^2

Answer :

The terms which have the same algebraic factors are called like terms. However, when the terms have different algebraic factors, these are called unlike terms.

(i) 1, 100

Like

(ii) - 7*x*, $\frac{5}{2}x$

Like

(iii) - 29*x*, - 29*y*

Unlike

(iv) 14*xy*, 42*yx*

Like

(v) $4m^2p$, $4mp^2$

Unlike

(vi) 12*xz*, $12x^2z^2$

Unlike

Q7 :
Identify like terms in the following:

(a) $-xy^2$, - 4yx^2, 8x^2, 2xy^2, 7*y*, - 11x^2, - 100*x*, -11*yx*, 20x^2y, -6x^2, *y*, 2*xy*,3*x*

(b) 10*pq*, 7*p*, 8*q*, - p^2q^2, - 7*qp*, - 100*q*, - 23, 12q^2p^2, - 5p^2, 41, 2405*p*, 78*qp*, 13p^2q, qp^2, 701p^2

Answer :

(a) $-xy^2$, $2xy^2$

$-4yx^2$, $20x^2y$
$8x^2$, $-11x^2$, $-6x^2$

$7y$, y

$-100x$, $3x$

$-11xy$, $2xy$

(b) $10pq$, $-7qp$, $78qp$

$7p$, $2405p$

$8q$, $-100q$

$-p^2q^2$, $12p^2q^2$

-23, 41

$-5p^2$, $701p^2$

$13p^2q$, qp^2

Exercise 12.2 : Solutions of Questions on Page Number : **239**

Q1 :

Simplify combining like terms:

(i) $21b - 32 + 7b - 20b$

(ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z$

(iii) $p - (p - q) - q - (q - p)$

(iv) $3a - 2b - ab - (a - b + ab) + 3ab + b - a$

(v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$

(vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

Answer :

(i) $21b - 32 + 7b - 20b = 21b + 7b - 20b - 32$

$= b\,(21 + 7 - 20) - 32$

$= 8b - 32$

(ii) $-z^2 + 13z^2 - 5z + 7z^3 - 15z = 7z^3 - z^2 + 13z^2 - 5z - 15z$

$= 7z^3 + z^2\,(-1 + 13) + z\,(-5 - 15)$

$= 7z^3 + 12z^2 - 20z$

(iii) $p - (p - q) - q - (q - p) = p - p + q - q - q + p$

$= p - q$

(iv) $3a - 2b - ab - (a - b + ab) + 3ba + b - a$

$= 3a - 2b - ab - a + b - ab + 3ab + b - a$

$= 3a - a - a - 2b + b + b - ab - ab + 3ab$

$= a\,(3 - 1 - 1) + b\,(-2 + 1 + 1) + ab\,(-1 - 1 + 3)$

$= a + ab$

(v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$

$= 5x^2y + 3yx^2 - 5x^2 + x^2 - 3y^2 - y^2 - 3y^2 + 8xy^2$

$= x^2y\,(5 + 3) + x^2\,(-5 + 1) + y^2(-3 - 1 - 3) + 8xy^2$

$= 8x^2y - 4x^2 - 7y^2 + 8xy^2$

(vi) $(3y^2 + 5y - 4) - (8y - y^2 - 4)$

$= 3y^2 + 5y - 4 - 8y + y^2 + 4$

$= 3y^2 + y^2 + 5y - 8y - 4 + 4$

$= y^2 (3 + 1) + y (5 - 8) + 4 (1 - 1)$

$= 4y^2 - 3y$

Q2 :

Add:

(i) $3mn, -5mn, 8mn, -4mn$

(ii) $t - 8tz, 3tz - z, z - t$

(iii) $-7mn + 5, 12mn + 2, 9mn - 8, -2mn - 3$

(iv) $a + b - 3, b - a + 3, a - b + 3$

(v) $14x + 10y - 12xy - 13, 18 - 7x - 10y + 8xy, 4xy$

(vi) $5m - 7n, 3n - 4m + 2, 2m - 3mn - 5$

(vii) $4x^2y, -3xy^2, -5xy^2, 5x^2y$

(viii) $3p^2q^2 - 4pq + 5, -10p^2q^2, 15 + 9pq + 7p^2q^2$

(ix) $ab - 4a, 4b - ab, 4a - 4b$

(x) $x^2 - y^2 - 1 , y^2 - 1 - x^2, 1- x^2 - y^2$

Answer :

(i) $3mn + (-5mn) + 8mn + (-4mn) = mn (3 - 5 + 8 - 4)$

$= 2mn$

(ii) $(t - 8tz) + (3tz - z) + (z - t) = t - 8tz + 3tz - z + z - t$

$= t - t - 8tz + 3tz - z + z$

$= t (1 - 1) + tz (- 8 + 3) + z (- 1 + 1)$

$= -5tz$

(iii) $(- 7mn + 5) + (12mn + 2) + (9mn - 8) + (- 2mn - 3)$

$= - 7mn + 5 + 12mn + 2 + 9mn - 8 - 2mn - 3 =$

$- 7mn + 12mn + 9mn - 2mn + 5 + 2 - 8 - 3$

$= mn (- 7 + 12 + 9 - 2) + (5 + 2 - 8 - 3)$

$= 12mn - 4$

(iv) $(a + b - 3) + (b - a + 3) + (a - b + 3)$

$= a + b - 3 + b - a + 3 + a - b + 3$

$= a - a + a + b + b - b - 3 + 3 + 3$

$= a (1 - 1 + 1) + b (1 + 1 - 1) + 3 (- 1 + 1 + 1)$

$= a + b + 3$

(v) $(14x + 10y - 12xy - 13) + (18 - 7x - 10y + 8yx) + 4xy$

$= 14x + 10y - 12xy - 13 + 18 - 7x - 10y + 8yx + 4xy$

$= 14x - 7x + 10y - 10y - 12xy + 8yx + 4xy - 13 + 18$

$= x\,(14 - 7) + y\,(10 - 10) + xy\,(-12 + 8 + 4) - 13 + 18$

$= 7x + 5$

(vi) $(5m - 7n) + (3n - 4m + 2) + (2m - 3mn - 5)$

$= 5m - 7n + 3n - 4m + 2 + 2m - 3mn - 5$

$= 5m - 4m + 2m - 7n + 3n - 3mn + 2 - 5$

$= m\,(5 - 4 + 2) + n\,(-7 + 3) - 3mn + 2 - 5$

$= 3m - 4n - 3mn - 3$

(vii) $4x^2y - 3xy^2 - 5xy^2 + 5x^2y = 4x^2y + 5x^2y - 3xy^2 - 5xy^2$

$= x^2y\,(4 + 5) + xy^2\,(-3 - 5)$

$= 9x^2y - 8xy^2$

(viii) $(3p^2q^2 - 4pq + 5) + (-10\,p^2q^2) + (15 + 9pq + 7p^2q^2)$

$= 3p^2q^2 - 4pq + 5 - 10\,p^2q^2 + 15 + 9pq + 7p^2q^2$

$= 3p^2q^2 - 10\,p^2q^2 + 7p^2q^2 - 4pq + 9pq + 5 + 15$

$= p^2q^2\,(3 - 10 + 7) + pq\,(-4 + 9) + 5 + 15$

$= 5pq + 20$

(ix) $(ab - 4a) + (4b - ab) + (4a - 4b)$

$= ab - 4a + 4b - ab + 4a - 4b$

$= ab - ab - 4a + 4a + 4b - 4b$

$= ab\,(1 - 1) + a\,(-4 + 4) + b(4 - 4)$

$= 0$

(x) $(x^2 - y^2 - 1) + (y^2 - 1 - x^2) + (1 - x^2 - y^2)$

$= x^2 - y^2 - 1 + y^2 - 1 - x^2 + 1 - x^2 - y^2$

$= x^2 - x^2 - x^2 - y^2 + y^2 - y^2 - 1 - 1 + 1$

$= x^2(1 - 1 - 1) + y^2\,(-1 + 1 - 1) + (-1 - 1 + 1)$

$= -x^2 - y^2 - 1$

Q3 :
Subtract:

(i) $-5y^2$ **from** y^2

(ii) $6xy$ **from** $-12xy$

(iii) $(a - b)$ **from** $(a + b)$

(iv) $a(b - 5)$ **from** $b(5 - a)$

(v) $-m^2 + 5mn$ **from** $4m^2 - 3mn + 8$

(vi) $-x^2 + 10x - 5$ **from** $5x - 10$

(vii) $5a^2 - 7ab + 5b^2$ **from** $3ab - 2a^2 - 2b^2$ **(viii)**

$4pq - 5q^2 - 3p^2$ **from** $5p^2 + 3q^2 - pq$

Answer :

(i) $y^2 - (-5y^2) = y^2 + 5y^2 = 6y^2$

(ii) $-12xy - (6xy) = -18xy$

(iii) $(a + b) - (a - b) = a + b - a + b = 2b$

(iv) $b(5 - a) - a(b - 5) = 5b - ab - ab + 5a$

$= 5a + 5b - 2ab$

(v) $(4m^2 - 3mn + 8) - (-m^2 + 5mn) = 4m^2 - 3mn + 8 + m^2 - 5mn$

$= 4m^2 + m^2 - 3mn - 5mn + 8$

$= 5m^2 - 8mn + 8$

(vi) $(5x - 10) - (-x^2 + 10x - 5) = 5x - 10 + x^2 - 10x + 5$

$= x^2 + 5x - 10x - 10 + 5$

$= x^2 - 5x - 5$

(vii) $(3ab - 2a^2 - 2b^2) - (5a^2 - 7ab + 5b^2)$

$= 3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2$

$= 3ab + 7ab - 2a^2 - 5a^2 - 2b^2 - 5b^2$

$= 10ab - 7a^2 - 7b^2$

(viii) $4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$

$(5p^2 + 3q^2 - pq) - (4pq - 5q^2 - 3p^2)$

$= 5p^2 + 3q^2 - pq - 4pq + 5q^2 + 3p^2$

$= 5p^2 + 3p^2 + 3q^2 + 5q^2 - pq - 4pq$

$= 8p^2 + 8q^2 - 5pq$

Q4 :

(a) What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?

(b) What should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?

Answer :

(a) Let a be the required term. $a + (x^2 + y^2 + xy) = 2x^2 + 3xy$ $a = 2x^2 + 3xy - (x^2 + y^2 + xy)$ $a = 2x^2 + 3xy - x^2 - y^2 - xy$ a

$= 2x^2 - x^2 - y^2 + 3xy - xy$

$= x^2 - y^2 + 2xy$

(b) Let p be the required term. $(2a + 8b + 10) - p = -3a + 7b + 16$ $p = 2a + 8b + 10 - (-3a + 7b + 16)$

$= 2a + 8b + 10 + 3a - 7b - 16$

$= 2a + 3a + 8b - 7b + 10 - 16$

= 5a + b - 6

Q5 :

What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain -

$x^2 - y^2 + 6xy + 20$?

Answer :

Let p be the required term.

$(3x^2 - 4y^2 + 5xy + 20) - p = - x^2 - y^2 + 6xy + 20$ p

$= (3x^2 - 4y^2 + 5xy + 20) - (- x^2 - y^2 + 6xy + 20) =$

$3x^2 - 4y^2 + 5xy + 20 + x^2 + y^2 - 6xy - 20 = 3x^2 + x^2$

$- 4y^2 + y^2 + 5xy - 6xy + 20 - 20$

$= 4x^2 - 3y^2 - xy$

Q6 :

(a) From the sum of $3x - y + 11$ and $- y - 11$, subtract $3x - y - 11$.

(b) From the sum of $4 + 3x$ and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $- x^2 + 2x + 5$.

Answer :

(a) $(3x - y + 11) + (- y - 11)$

$= 3x - y + 11 - y - 11$

$= 3x - y - y + 11 - 11$

$= 3x - 2y$

$(3x - 2y) - (3x - y - 11)$

$= 3x - 2y - 3x + y + 11$

$= 3x - 3x - 2y + y + 11$

$= - y + 11$

(b) $(4 + 3x) + (5 - 4x + 2x^2) = 4 + 3x + 5 - 4x + 2x^2$

$= 3x - 4x + 2x^2 + 4 + 5$

$= - x + 2x^2 + 9$

$(3x^2 - 5x) + (- x^2 + 2x + 5) = 3x^2 - 5x - x^2 + 2x + 5$

$= 3x^2 - x^2 - 5x + 2x + 5$

$= 2x^2 - 3x + 5$

$(- x + 2x^2 + 9) - (2x^2 - 3x + 5)$

$= - x + 2x^2 + 9 - 2x^2 + 3x - 5$

$= - x + 3x + 2x^2 - 2x^2 + 9 - 5$

$= 2x + 4$

Exercise 12.3 : Solutions of Questions on Page Number : **242**

Q1 :

If m = 2, find the value of:

(i) m - 2 (ii) 3m - 5 (iii) 9 - 5m

(iv) $3m^2 - 2m - 7$ (v) $\frac{5m}{2} - 4$

Answer :

(i) $m - 2 = 2 - 2 = 0$

(ii) $3m - 5 = (3 \times 2) - 5 = 6 - 5 = 1$

(iii) $9 - 5m = 9 - (5 \times 2) = 9 - 10 = -1$

(iv) $3m^2 - 2m - 7 = 3 \times (2 \times 2) - (2 \times 2) - 7$

$= 12 - 4 - 7 = 1$

(v) $\frac{5m}{2} - 4 = \left(\frac{5 \times 2}{2}\right) - 4 = 1$

Q2 :

If p = -2, find the value of:

(i) $4p + 7$

(ii) $-3p^2 + 4p + 7$

(iii) $-2p^3 - 3p^2 + 4p + 7$

Answer :

(i) $4p + 7 = 4 \times (-2) + 7 = -8 + 7 = -1$

(ii) $-3p^2 + 4p + 7 = -3 (-2) \times (-2) + 4 \times (-2) + 7$

$= -12 - 8 + 7 = -13$

(iii) $-2p^3 - 3p^2 + 4p + 7$

$= -2 (-2) \times (-2) \times (-2) - 3 (-2) \times (-2) + 4 \times (-2) + 7$

$= 16 - 12 - 8 + 7 = 3$

Q3 :

Find the value of the following expressions, when x = - 1:

(i) 2x - 7 (ii) - x + 2 (iii) $x^2 + 2x + 1$

(iv) $2x^2 - x - 2$

Answer :

(i) $2x - 7$

$= 2 \times (-1) - 7 = -9$

(ii) $- x + 2 = - (-1) + 2 = 1 + 2 = 3$

(iii) $x^2 + 2x + 1 = (-1) \times (-1) + 2 \times (-1) + 1$

$= 1 - 2 + 1 = 0$

(iv) $2x^2 - x - 2 = 2 (-1) \times (-1) - (-1) - 2$

$= 2 + 1 - 2 = 1$

Q4 :
If $a = 2$, $b = -2$, find the value of:

(i) $a^2 + b^2$ (ii) $a^2 + ab + b^2$ (iii) $a^2 - b^2$

Answer :

(i) $a^2 + b^2$

$= (2)^2 + (-2)^2 = 4 + 4 = 8$

(ii) $a^2 + ab + b^2$

$= (2 \times 2) + 2 \times (-2) + (-2) \times (-2)$

$= 4 - 4 + 4 = 4$

(iii) $a^2 - b^2 = (2)^2 - (-2)^2 = 4 - 4 = 0$

Q5 :
When $a = 0$, $b = -1$, find the value of the given expressions:

(i) $2a + 2b$ (ii) $2a^2 + b^2 + 1$

(iii) $2a^2 b + 2ab^2 + ab$ (iv) $a^2 + ab + 2$

Answer :

(i) $2a + 2b = 2 \times (0) + 2 \times (-1) = 0 - 2 = -2$

(ii) $2a^2 + b^2 + 1$

$= 2 \times (0)^2 + (-1) \times (-1) + 1$

$= 0 + 1 + 1 = 2$

(iii) $2a^2b + 2ab^2 + ab$

$= 2 \times (0)^2 \times (-1) + 2 \times (0) \times (-1) \times (-1) + 0 \times (-1)$

$= 0 + 0 + 0 = 0$ (iv)

$a^2 + ab + 2$

$= (0)^2 + 0 \times (-1) + 2$

$= 0 + 0 + 2 = 2$

Q6 :
Simplify the expressions and find the value if x is equal to 2

(i) $x + 7 + 4 (x - 5)$ (ii) $3 (x + 2) + 5x - 7$

(iii) $6x + 5 (x - 2)$ (iv) $4 (2x - 1) + 3x + 11$

Answer :
(i) $x + 7 + 4 (x - 5) = x + 7 + 4x - 20$

$= x + 4x + 7 - 20$

$= 5x - 13$

= (5 x 2) - 13

= 10 - 13 = -3

(ii) 3 (x + 2) + 5x - 7 = 3x + 6 + 5x - 7

= 3x + 5x + 6 - 7 = 8x - 1

= (8 x 2) - 1 = 16 - 1 =15

(iii) 6x + 5 (x - 2) = 6x + 5x - 10

= 11x - 10

= (11 x 2) - 10 = 22 - 10 = 12

(iv) 4 (2x - 1) + 3x + 11 = 8x - 4 + 3x + 11

= 11x + 7

= (11 x 2) + 7 =
22 + 7 = 29

Q7 :
Simplify these expressions and find their values if x = 3, a = - 1, b = - 2.

(i) 3x - 5 - x + 9 (ii) 2 - 8x + 4x + 4

(iii) 3a + 5 - 8a + 1 (iv) 10 - 3b - 4 - 5b

(v) 2a - 2b - 4 - 5 + a

Answer :

(i) 3x - 5 - x + 9 = 3x - x - 5 + 9

= 2x + 4 = (2 x 3) + 4 = 10

(ii) 2 - 8x + 4x + 4 = 2 + 4 - 8x + 4x

= 6 - 4x = 6 - (4 x 3) = 6 - 12 = -6

(iii) 3a + 5 - 8a + 1 = 3a - 8a + 5 + 1

= - 5a + 6 = -5 x (-1) + 6

= 5 + 6 = 11

(iv) 10 - 3b - 4 - 5b = 10 - 4- 3b - 5b

= 6 - 8b = 6 - 8 x (-2)

= 6 + 16 = 22

(v) 2a - 2b - 4 - 5 + a = 2a + a - 2b - 4 - 5

= 3a - 2b - 9s

= 3 x (-1) - 2 (-2) - 9

= - 3 + 4 - 9 = -8

Q8 :
(i) Ifz = 10, find the value of z^3 - 3 (z - 10).

(ii) If p = - 10, find the value of p^2 - 2p - 100

Answer :

(i) $z^3 - 3(z - 10) = z^3 - 3z + 30$
$= (10 \times 10 \times 10) - (3 \times 10) + 30$

$= 1000 - 30 + 30 = 1000$

(ii) $p^2 - 2p - 100$

$= (-10) \times (-10) - 2(-10) - 100$

$= 100 + 20 - 100 = 20$

Q9 :
What should be the value of *a* if the value of $2x^2 + x - a$ equals to 5, when $x = 0$?

Answer :

$2x^2 + x - a = 5$, when $x = 0$

$(2 \times 0) + 0 - a = 5$
$0 - a = 5 \quad a = -5$

Q10 :
Simplify the expression and find its value when $a = 5$ and $b = -3$. 2

$(a^2 + ab) + 3 - ab$

Answer :

$2(a^2 + ab) + 3 - ab = 2a^2 + 2ab + 3 - ab$

$= 2a^2 + 2ab - ab + 3$

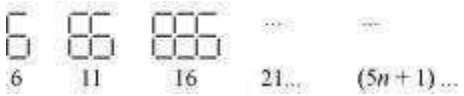
$= 2a^2 + ab + 3$

$= 2 \times (5 \times 5) + 5 \times (-3) + 3$

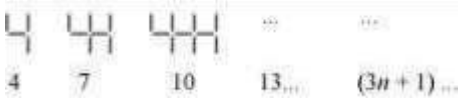
$= 50 - 15 + 3 = 38$

Exercise 12.4 : Solutions of Questions on Page Number : **246**

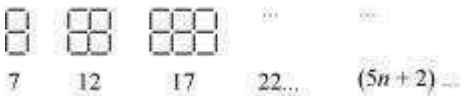
Q1 :
Observe the patterns of digits made from line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators. (a)



(b)



(c)



If the number of digits formed is taken to be *n*, the number of segments required to form *n* digits is given by the algebraic expression appearing on the right of each pattern.

How many segments are required to form 5, 10, 100 digits of the kind -

Answer :

(a) It is given that the number of segments required to form *n* digits of the kind

 is (5*n* + 1).

Number of segments required to form 5 digits = (5 x 5 + 1)

= 25 + 1 = 26

Number of segments required to form 10 digits = (5 x 10 + 1)

= 50 + 1 = 51

Number of segments required to form 100 digits = (5 x 100 + 1)

= 500 + 1 = 501

(b) It is given that the number of segments required to form *n* digits of the kind  is (3*n* + 1).

Number of segments required to form 5 digits = (3 x 5 + 1)

= 15 + 1 = 16

Number of segments required to form 10 digits = (3 x 10 + 1)

= 30 + 1 = 31

Number of segments required to form 100 digits = (3 x 100 + 1)

= 300 + 1 = 301

(c)It is given that the number of segments required to form *n* digits of the kind  is (5*n* + 2).

Number of segments required to form 5 digits = (5 x 5 + 2)

= 25 + 2 = 27

Number of segments required to form 10 digits = (5 x 10 + 2)

= 50 + 2 = 52

Number of segments required to form 100 digits = (5 x 100 + 2)

= 500 + 2 = 502

S. No	Expression	Terms									
		1st	2nd	3rd	4th	5th	…	10th	…	100th	…
(i)	$2n - 1$	1	3	5	7	9	-	19	-	-	-
(ii)	$3n + 2$	2	5	8	11	-	-	-	-	-	-
(iii)	$4n + 1$	5	9	13	17	-	-	-	-	-	-
(iv)	$7n + 20$	27	34	41	48	-	-	-	-	-	-
(v)	$n^2 + 1$	2	5	10	17	-	-	-	-	10, 001	-

Answer :

Q2 :

Use the given algebraic expression to complete the table of number patterns. The given table can be completed as follows.

S.No.	Expression	Terms									
		1st	2nd	3rd	4th	5th	…	10th	…	100th	…
(i)	$2n - 1$	1	3	5	7	9	-	19	-	199	-
(ii)	$3n + 2$	2	5	8	11	17	-	32	-	302	-
(iii)	$4n + 1$	5	9	13	17	21	-	41	-	401	-
(iv)	$7n + 20$	27	34	41	48	55	-	90	-	720	-
(v)	$n^2 + 1$	2	5	10	17	26	-	101	-	10,001-	-