Class VIII Session 2025-26
Subject - Mathematics
Sample Question Paper - 6

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This Question Paper has 4 Sections A-D.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 6 questions carrying 02 marks each.
4. Section C has 8 questions carrying 03 marks each.
5. Section D has 6 questions carrying 04 marks each.
6. All Questions are compulsory.
7. Draw neat figures wherever required. Take π =22/7 wherever required if not stated

Section A

1. Without doing any calculation, find the numbers which are surely perfect squares: **[1]**

   a) 2688 b) 2025

   c) 2673 d) 2657

2. Two adjacent angles of a parallelogram are in the ratio 1 : 5. Then, all the angles of the parallelogram are **[1]**

   a) 30°, 150°, 30°, 150° b) 45°, 135°, 45°, 135°

   c) 30°, 180°, 30°, 180° d) 85°, 95°, 85°, 95°

3. Factorise: $x^2 + 8x + 16$ **[1]**

   a) $(x + 3)^2$ b) $(x + 4)^2$

   c) $(x + 5)^2$ d) $(x + 2)^2$

4. A shirt with marked price Rs 800 was sold at Rs 680. The rate of discount allowed on the shirt is **[1]**

   a) 25% b) 20%

   c) 10% d) 15%

5. The value of $(0.3)^3$ is _____. **[1]**

   a) 0.027 b) .27

   c) 27 d) 2.7

6. Solve the equation: 2x - 3 = x + 2 **[1]**

   a) 3 b) 4

   c) 0 d) 5

7. Which of the following is not a perfect cube? **[1]**

a) 1000 b) 10000

c) 216 d) 1000000

8. Which of the following is true for a polyhedron? **[1]**

a) Faces = 4, Vertices = 5, Edges = 6 b) Faces = 5, Vertices = 6, Edges = 9

c) Faces = 18, Vertices = 10, Edges = 25 d) Faces = 5, Vertices = 1, Edges = 7

9. Find $\frac{7}{8} + \left(-\frac{5}{16}\right) + \left(-\frac{3}{16}\right) + \frac{5}{8}$ **[1]**

a) 1 b) -21

c) -1 d) -16

10. 72% of 25 students are good in mathematics. How many are not good in mathematics? **[1]**

a) 18% b) 30%

c) 25% d) 28%

11. The measure of each interior angle of a regular convex polygon is 156^o. The number of sides of the polygon is : **[1]**

a) 15 b) 12

c) 8 d) 10

12. The value of $(0.000064)^{\frac{5}{6}}$ is **[1]**

a) $\frac{16}{10000}$ b) $\frac{16}{100000}$

c) $\frac{32}{100000}$ d) $\frac{32}{10000}$

13. x(x - 3) + 2 = ? **[1]**

a) $x^2 + 3x + 5$ b) $x^2 - 2x + 2$

c) $x^2 - 3x + 2$ d) $x^2 - 5x + 3$

14. The standard form of 0.0000040 is **[1]**

a) 4.0×10^{-7} b) 4.0×10^{-6}

c) 4.0×10^{-4} d) 4.0×10^{-5}

15. $(4a^2 - 4ab + b^2) \div (2a - b)$ is the same as **[1]**

a) 2a b) (2a + b)

c) (2a - b) d) b

16. An agent receives a commission of ₹ 73 on sales of ₹ 1000. The commission he will get on sales of ₹ 100 is _____. **[1]**

a) ₹ 7 b) ₹ 6.30

c) ₹ 7.30 d) ₹ 6

17. One (1) is: **[1]**

a) the identity for the subtraction of rational numbers b) the identity for division of rational numbers

c) the identity for multiplication of rational numbers

d) the identity for the addition of rational numbers

18. A group of students decided to collect as many paise from each member of the group as is the number of members. If the total collection amounts to Rs.22.09, the number of members in the group is: **[1]**

a) 47

b) 37

c) 107

d) 43

19. Solve: $2y + \frac{5}{3} = \frac{26}{3} - y$ **[1]**

a) $\frac{7}{3}$

b) 7

c) 3

d) $\frac{5}{3}$

20. The perimeter of one face of a cube is 40 cm. What is its surface area? **[1]**

a) 600 cm^2

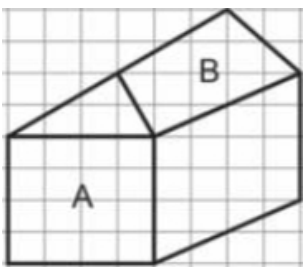
b) 500 cm^2

c) 400 cm^2

d) 240 cm^2

Section B

21. A sketch of a house on a grid is shown below. **[2]**



1 block represents one square unit.

Is face A identical to face B? Explain your answer.

22. Find the smallest number by which of 100 must be multiplied to obtain a perfect cube. **[2]**

OR

Using prime factorisation, find the cube root of 2197.

23. A die is rolled once. What is the probability that the number on top will be **[2]**

a. odd

b. greater than 5

c. a multiple of 3

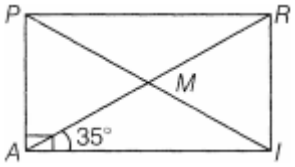
d. less than 1

e. A factor of 36

f. A factor of 6

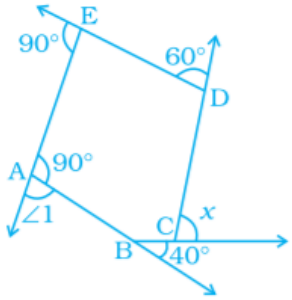
24. Multiply the binomials: (y - 8) and (3y - 4) **[2]**

25. In rectangle PAIR, find ∠ARI, ∠RMI and ∠PMA. **[2]**



OR

Find x in the following figure.



26. Solve the linear equation: $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$ **[2]**

27. Find the square root of the following by long division method. **[3]**

i. 1369

ii. 5625

28. Subtract: 3a(a + b + c) - 2b(a - b + c) from 4c(-a + b + c). **[3]**

29. Verify and name the property used **[3]**

$\left(\frac{-3}{5} \times \frac{12}{13}\right) \times \frac{7}{8} = \frac{-3}{5} \times \left(\frac{12}{13} \times \frac{7}{8}\right)$.

30. Compare the numbers 2.7×10^{12} and 1.5×10^{8} **[3]**

31. How many small cubes with edge of 20cm each can be just accommodated in a cubical box of 2m edge? **[3]**

32. Work out the division: 96abc (3a – 12) (5b – 30) ÷ 144 (a – 4) (b – 6) **[3]**

33. Solve: $\frac{x}{2} - \frac{1}{4}\left(x - \frac{1}{3}\right) = \frac{1}{6}(x + 1) + \frac{1}{12}$ **[3]**

OR

Solve the equations and check your result: $\frac{2x}{3} + 1 = \frac{7x}{15} + 3$

34. Vishakha offers a discount of 20% on all the items at her shop and still makes a profit of 12%. What is the cost price of an article marked at Rs 280? **[3]**

OR

The marked price of a DVD is ₹4500. A shopkeeper allows two successive discounts of 10% and 5% by the force of a customer. Find the selling price of the customer after two discounts are given.

35. Calculate the amount and compound interest on ₹ 18,000 for $2\frac{1}{2}$ years at 10% per annum compounded annually. **[4]**

OR

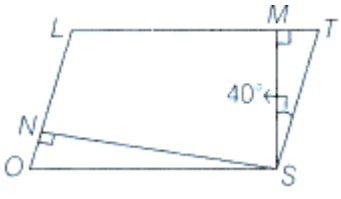
Fabina borrow ₹ 12500 at 12% per annum for 3 years at simple interest and Radha borrows the same amount for the same time period at 10% per annum, compounded annually. Who pays interest and by how much?

36. For the development of basic infrastructure in a district, a project of ₹108 crore approved by Development Bank is as follows: **[4]**

Item head	Road	Electricity	Drinking water	Sewerage
Amount (in ₹ crore)	43.2	16.2	27.00	21.6

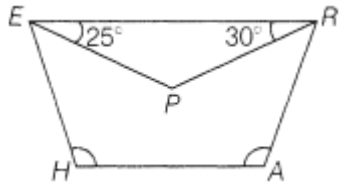
Draw a pie chart for this data.

37. In parallelogram LOST, SN⊥OL and SM⊥LT. Find ∠STM, ∠SON and ∠NSM. **[4]**

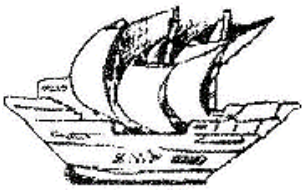


OR

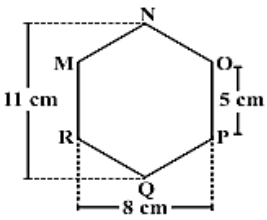
In trapezium HARE, EP and RP are bisectors of ∠E and ∠R, respectively. Find ∠HAR and ∠EHA.

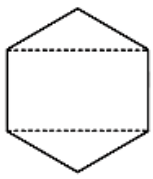


38. In a model of a ship, the mast is 9 cm high, while the mast of the actual ship is 12 cm high. If the length of the ship is 28 m, how long is the model ship? **[4]**

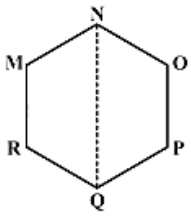


39. There is a hexagon MNOPQR of side 5 cm (Fig.). Aman and Ridhima divided it in two different ways (Fig). Find the area of this hexagon using both ways. **[4]**





Ridhima's method



Aman's method

40. Draw a graph for the following. **[4]**

Side of square (in cm)	2	3	3.5	5	6
Perimeter (in cm)	8	12	14	20	24

i. Write the scale along the X axis and Y axis?

ii. What is marked on the horizontal axis?

iii. What is marked on the vertical axis?

iv. What is marked on the points plotted?

v. Is it a line graph?

Solution

Section A

1.

(b) 2025

Explanation:

2025 is a perfect square as it ends with 5 at the unit's place whereas the other numbers 2657, 2688, and 2673 ends with 7, 8, and 3 at the unit's place and a perfect square never end with 2, 3, 7 and 8 at unit's place.

2. **(a)** 30°, 150°, 30°, 150°

Explanation:

Let the adjacent angles of a parallelogram be x and 5x, respectively.

Then, x + 5x = 180° [∵ adjacent angles of a parallelogram are supplementary]

$\Rightarrow$ 6x = 180°

$\Rightarrow$ x = 30°

∴ The adjacent angles are 30° and 150°.

Hence, the angles are 30°, 150°, 30°, 150° [∵ opposite angles are equal]

3.

(b) $(x + 4)^2$

Explanation:

$x^2 + 8x + 16$

By substituting, we get,

$= x^2 + 4x + 4x + 16$

By grouping

$= x(x + 4) + 4(x + 4)$

$= (x + 4)(x + 4)$

$= (x + 4)^2$

4.

(d) 15%

Explanation:

The marked price = Rs 800

Selling price = Rs 680

Discount = 800 - 680 = Rs 120

percentage discount = $\frac{120}{800} \times 100$

= 15%

5. **(a)** 0.027

Explanation:

$(0.3)^3 = 0.027$

6.

(d) 5

Explanation:

2x - 3 = x + 2

By transposig both sides

2x - x = 2 + 3

x = 5

7.

(b) 10000

Explanation:

$\sqrt[3]{1000000}$ = 100 is a perfect cube.

$\sqrt[3]{216}$ = 6 is a perfect cube.

$\sqrt[3]{10000}$ = not a perfect cube.

8.

(b) Faces = 5, Vertices = 6, Edges = 9

Explanation:

Euler's formula for polyhedron is F + V - E = 2

F = 5, V = 6, E = 9

∴ F + V - E = 5 + 6 - 9 = 2, True

9. **(a)** 1

Explanation:

$[\frac{7}{8} + (\frac{-5}{16})] + [(\frac{-3}{16}) + \frac{5}{8}]$

$= [\frac{7\times2+(-5)\times1}{16}] + [\frac{-3\times1+2\times5}{16}]$

$= [\frac{14-5}{16}] + [\frac{-3+10}{16}]$

$= \frac{9}{16} + \frac{7}{16}$

$= \frac{16}{16}$

= 1

10.

(d) 28%

Explanation:

Given 72% of students are good in English.

So, 100 - 72 = 28% of students are not good in English.

11. **(a)** 15

Explanation:

We know that Sum of all the Internal angles of polygon

= 180 × (n - 2)

According to question 180 (n - 2) = 156 × n

$\Rightarrow$ 180n - 360^o = 156n

$\Rightarrow$ 180n - 156n = 360

24n = 360

n = $\frac{360}{24}$ = 15

12.

(c) $\frac{32}{100000}$

Explanation:

$(0.000064)^{\frac{5}{6}} = \left(\frac{64}{1000000}\right)^{\frac{5}{6}}$

$= \left[\left\{\left(\frac{2}{10}\right)^6\right\}^{1/6}\right]^5 = \left(\frac{2}{10}\right)^5 = \frac{32}{100000}$

13.

(c) x^2 - 3x + 2

Explanation:

x(x – 3) + 2

Open the brackets we get,

$x^2 - 3x + 2$

14.

(b) 4.0×10^{-6}

Explanation:

∴ Standard form of 0.0000040

$= \frac{4.0}{10^6} = 4.0 \times 10^{-6}$ [$\because \frac{1}{a^m} = a^{-m}$]

15.

(c) (2a - b)

Explanation:

$(4a^2 - 4ab + b^2) \div (2a - b)$

$= \frac{[(2a)^2 - 2(2a)(b) + (b)^2)]}{(2a - b)}$

$= \frac{[(2a - b)(2a - b)]}{(2a - b)}$

by cancelling (2a - b) both side

= (2a - b)

16.

(c) ₹ 7.30

Explanation:

Let commission received be ₹ y.

Sales (in ₹)	1000	100
Commission (in ₹)	73	y

It is a case of direct proportion.

Hence, $\frac{1000}{73} = \frac{100}{y} \Rightarrow$ y = ₹ 7.30

17.

(c) the identity for multiplication of rational numbers

Explanation:

One (1) is the identity for multiplication of rational numbers. That means, If a is a rational number. Then, a.1 = 1.a = a

18. **(a)** 47

Explanation:

Number of members = $\sqrt{2209}$ = 47.

19. **(a)** $\frac{7}{3}$

Explanation:

$2y + \frac{5}{3} = \frac{26}{3} - y$

or, $2y + y = \frac{26}{3} - \frac{5}{3}$

or, $3y = \frac{21}{3}$

or, 3y = 7

or, $y = \frac{7}{3}$

20. **(a)** 600 cm^2

Explanation:

The perimeter of one face of a cube = 40 cm

The perimeter of one face of a cube = 4 × side

40 = 4 × side

$\frac{40}{4}$ = side

10cm = side

The surface area of cube = $6(\text{side})^2$

$S = 6(10)^2$

$S = 6 \times 10 \times 10 = 600\ cm^2$

surface area of cube = $600\ cm^2$

Section B

21.
- No face A is not identical to face B because face A is a square and face B is a rectangle.
- No face A is not identical to face B because area of both faces are not equal.

22.

2	100
2	50
5	25
5	5
	1

Prime factors of 100 = $2 \times 2 \times 5 \times 5$

Here factor 2 and 5 both do not appear in 3's group.

Therefore 100 must be multiplied by $2 \times 5 = 10$ to make it a perfect cube.

OR

We have, 2197

13	2197
13	169
13	13
	1

Now, $2197 = 13 \times 13 \times 13$

$\therefore \quad \sqrt[3]{2197} = 13$

23. When a die is rolled once, then the possible outcomes are 1,2, 3, 4, 5, and 6.

∴ Probability that number on top will be

a. odd = $\frac{3}{6} = \frac{1}{2}$

b. greater than 5 = $\frac{1}{6}$

c. a multiple of 3 = $\frac{2}{6} = \frac{1}{3}$

d. less than 1 = 0

e. a factor of 36 = $\frac{5}{6}$

f. a factor of 6 = $\frac{4}{6} = \frac{2}{3}$

24. $(y - 8) \times (3y - 4) = y(3y - 4) - 8(3y - 4)$

$= y \times 3y - y \times 4 - 8 \times 3y - 8 \times -4$

$= 3y^2 - 4y - 24y + 32$

$= 3y^2 - 28y + 32$

25. Given, $\angle RAI = 35^\circ$

$\therefore \quad \angle PRA = 35^\circ$ [PR || A I and AR is transversal]

$\Rightarrow \angle ARI = 90^\circ - \angle PRA = 90° - 35° = 55$

$\because \quad AM = IM, \angle MIA = \angle MAI = 35^\circ$

In $\triangle AMI, \angle RMI = \angle MAI + \angle MIA = 70^\circ$ [exterior angle]

Also, $\angle RMI = \angle PMA$

$\Rightarrow \quad \angle PMA = 70^\circ$ [vertically opposite angles]

OR

From the given figure it is clear that

$\angle 1 + 90^o = 180^o$ (linear pair)

$\Rightarrow \angle 1 = 90^o$

Now, $\angle A + \angle B + \angle C + \angle D + \angle E = 360^o$[Sum of exterior angles of a polygon = 360^o]

$90^o + 40^o + x + 60^o + 90^o = 360^o$

$x + 280^o = 360^o$

$x = 80^o$

26. m - $\frac{m-1}{2} = 1 - \frac{m-2}{3}$

It is a linear equation since it involves linear expressions only.

$\therefore m - \frac{m}{2} + \frac{1}{2} = 1 - \frac{m}{3} + \frac{2}{3}$

$\therefore m - \frac{m}{2} + \frac{m}{3} = 1 + \frac{2}{3} - \frac{1}{2}$ ... [Transposing $\frac{-m}{3}$ to L.H.S. and $\frac{1}{2}$ to R.H.S.]

$\therefore \frac{6m-3m+2m}{6} = \frac{6+4-3}{6}$

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

$\therefore$ m = $\frac{7}{6} \times \frac{6}{5}$ ... [Multiplying both sides by $\frac{6}{5}$]

$\therefore$ m = $\frac{7}{5}$ this is the required solution.

27. i. We have, 1369

	37
3	13 69
	9
67	469
	469
	0

$\therefore \quad \sqrt{1369} = 37$

ii. We have, 5625

	75
7	5625
	49
145	725
	725
	0

$\therefore \quad \sqrt{5625} = 75$

28. 4c(-a + b + c) - [3a(a + b + c) - 2b(a - b + c)]

= -4ac + 4bc + $4c^2$ - [$3a^2$ + 3ab + 3ac - 2ab + $2b^2$ - 2bc]

= -4ac + 4bc + $4c^2$ - [$3a^2$ + $2b^2$ + 3ab - 2bc + 3ac - 2ab]

= -4ac + 4bc + $4c^2$ - [$3a^2$ + $2b^2$ + ab + 3ac - 2bc]

= -4ac + 4bc + $4c^2$ - $3a^2$ - $2b^2$ - ab - 3ac + 2bc

= -$3a^2$ - $2b^2$ + $4c^2$ - ab + 4bc + 2bc - 4ac - 3ac

= -$3a^2$ - $2b^2$ + $4c^2$ - ab + 6bc - 7ac

29. L.H.S.

$\left(\frac{-3}{5} \times \frac{12}{13}\right) \times \frac{7}{8}$

$= \left(\frac{-36}{65}\right) \times \frac{7}{8}$

$= \left(\frac{-63}{130}\right)$

R.H.S.

$\frac{-3}{5} \times \left(\frac{12}{13} \times \frac{7}{8}\right)$

$= \frac{-3}{5} \times \left(\frac{84}{104}\right)$

$= \frac{-3}{5} \times \left(\frac{21}{26}\right)$

$= \left(\frac{-63}{130}\right)$

Therefore, L.H.S = R.H.S.

Hence, verified.

The property is Associative i.e. (a×b)×c = a×(b×c).

30. $2.7 \times 10^{12} = 2.7 \times (10 \times 10^{11}) = (2.7 \times 10) \times 10^{11} = 27 \times 10^{11}$

$1.5 \times 10^{8} = 1.5 \times (10 \times 10^{7}) = (1.5 \times 10) \times 10^{7} = 15 \times 10^{7}$

Now, 27 > 15 and

$10^{11} > 10^{7}$

Therefore, $27 \times 10^{11} > 15 \times 10^7$

Hence, $2.7 \times 10^{12} > 1.5 \times 10^8$

31. The volume of cubical box of 2 m edge will be $= 2 \times 2 \times 2 = 8\ m^3 = 8 \times 10^6\ cm^3$

The volume of small cubes with 20 cm edge $= 20 \times 20 \times 20 = 8000\ cm^3$

The number of small cubes that can be accomodated $= 8 \times 10^6 / 8000 = 1000$ boxes

32. 96abc (3a – 12) (5b – 30) ÷ 144 (a – 4) (b – 6)

$= \frac{96abc(3a-12)(5b-30)}{144(a-b)(b-6)}$

$= \frac{96abc \times 3(a-4) \times 5(b-6)}{144(a-4)(b-6)}$

= 10abc

33. Given, $\frac{x}{2} - \frac{1}{4}\left(x - \frac{1}{3}\right) = \frac{1}{6}(x+1) + \frac{1}{12}$

$\Rightarrow \quad \frac{x}{2} - \frac{x}{4} + \frac{1}{12} = \frac{x}{6} + \frac{1}{6} + \frac{1}{12}$

$\Rightarrow \quad \frac{2x-x}{4} + \frac{1}{12} = \frac{x}{6} + \frac{2+1}{12}$

$\Rightarrow \quad \frac{x}{4} + \frac{1}{12} = \frac{x}{6} + \frac{3}{12}$

$\Rightarrow \quad \frac{x}{4} - \frac{x}{6} = \frac{3}{12} - \frac{1}{12}$ [transposing $\frac{x}{6}$ to LHS and $\frac{1}{12}$to RHS]

$\Rightarrow \quad \frac{6x-4x}{24} = \frac{3-1}{12}$

$\Rightarrow \quad \frac{2x}{24} = \frac{2}{12}$

$\Rightarrow \quad 2 \times 12x = 2 \times 24$ [by cross-multiplication]

$\Rightarrow$ 24x = 48

$\Rightarrow \quad \frac{24x}{24} = \frac{48}{24}$ [dividing both sides by 24]

$\therefore$ x = 2

OR

$\frac{2x}{3} + 1 = \frac{7x}{15} + 3$

$\frac{2x}{3} - \frac{7x}{15}$ = 3 - 1 ... [Transposing $\frac{7x}{15}$ to L.H.S. and 1 to R.H.S.]

$\therefore \frac{2x}{3} - \frac{7x}{15}$ = 2

$\therefore 15\left(\frac{2x}{3} - \frac{7x}{15}\right)$ = 2 × 15 ... [Multiplying both sides by 15]

$\therefore$ 10x – 7x = 30

$\therefore$ 3x = 30

$\therefore$ x = $\frac{30}{3}$ ... [Dividing both sides by 3]

$\therefore$ x = 10 this is the required solution.

Verification,

L.H.S. = $\frac{2x}{3} + 1 = \frac{2}{3}(10) + 1 = \frac{20+3}{3} = \frac{23}{3}$

R.H.S. = $\frac{7x}{15} + 3 = \frac{7}{15}(10) + 3 = \frac{70}{15} + 3 = \frac{70 \div 5}{15 \div 5} + 3 = \frac{14+9}{3} = \frac{23}{3}$

Therefore, L.H.S. = R.H.S.

34. We have,

Marked Price = Rs 280

Discount = 20% of Rs 280

$= \frac{20}{100} \times 280$

= Rs 56

So, selling price = Rs (280 – 56)

= Rs 224

Now, Let the cost price be Rs 100

Profit = 12% of Rs 100

= Rs 12

So, selling price = Rs (100 + 12) = Rs 112

If the selling price is Rs 112 then cost price = Rs 100

If the selling price is Rs 224 then cost price = Rs $\left(\frac{100}{112} \times 224\right)$

= Rs 200.

OR

M.P. of DVD = ₹ 4500

First discount = 10% of ₹ 4500

$= \frac{10}{100} \times 4500 = ₹450$

Price after first discount = ₹ 4500 - ₹ 450= ₹ 4050

Second discount = 5% of reduced price

$= \frac{5}{100} \times Rs.4050 = \frac{20250}{100} = ₹202.50$

Net selling price of the DVD = ₹ 4050 - ₹ 202.50 = ₹3847.50.

35. By using year by year calculation

S.I. on ₹ 18000 at 10% per annum for 1 year

$= \frac{18000 \times 10 \times 1}{100} = ₹1800$

∴ Amount at the end of 1st year

= ₹ 18000 + ₹ 1800

= ₹ 19800

= Principle for 2nd year.

S.I. on ₹ 19800 at 10% per annum for 1 year

$= \frac{19800 \times 10 \times 1}{100}$

= ₹ 1980

∴ Amount at the end of 2nd year

= ₹ 19800 + ₹ 1980

= ₹ 21780

= Principle for 3rd year

S.I. on ₹ 21780 at 10% per annum for $\frac{1}{2}$ year

$= \frac{21780 \times 10 \times 1}{2 \times 100}$

= ₹ 1089

∴ Amount at the end of $2\frac{1}{2}$ years

= ₹ 21780 + ₹ 1089

= ₹ 22869

this is the required amount.

Now,

C.I. = ₹ 22869 – ₹ 18000

= ₹ 4869.

OR

For Fabina

S.I. on ₹ 12500 at 12% p.a. for 3 years

$= \frac{12500 \times 12 \times 3}{100}$

= ₹ 4500

For Radha

P = ₹ 12500

R = 10% per annum

n = 3 years

$\therefore A = P\left(1 + \frac{R}{100}\right)^n = 12500\left(1 + \frac{10}{100}\right)^3$

$= 12500\left(1 + \frac{1}{10}\right)^3 = 12500\left(\frac{11}{10}\right)^3$

$= 12500 \times \frac{11}{10} \times \frac{11}{10} \times \frac{11}{10}$

= ₹ 16637.50

∴ C.I. = A – P

= ₹ 16637.50 – ₹ 12500

= ₹ 4137.50

Difference between C.I. and S.I.

= ₹ 4500 – ₹ 4137.50

= ₹ 362.50

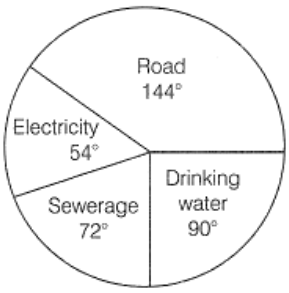
Hence, Fabina pays more by ₹ 362.50

36. Total amount = ₹ 108 crore

Item head	**Amount (in ₹ crore)**	**Central angle**

Road	43.2	$\frac{43.2}{108} \times 360^\circ = 144^\circ$
Electricity	16.2	$\frac{16.2}{108} \times 360^\circ = 54^\circ$
Drinking water	27.00	$\frac{27}{108} \times 360^\circ = 90^\circ$
Sewerage	21.6	$\frac{21.6}{108} \times 360^\circ = 72^\circ$

The pie chart is as follows:



37. It is given that ∠MST = 40°

In ΔMST,

∠TMS + ∠MST + ∠STM = 180° [By the angle sum property of a triangle]

⇒ ∠STM = 180° - (90° + 40°) = 50° [∵ SM⊥ LT, ∠TMS = 90°]

∠SON = ∠STM = 50° [∵ opposite angles of a parallelogram are equal]

Now, in the ΔONS,

∠ONS + ∠OSN + ∠SON - 180° [angle sum property of triangle]

∠OSN = 180° - (90° + 50°)

= 180° - 140° = 40°

Moreover, ∠SON + ∠TSO = 180° [∵ adjacent angles of a parallelogram are supplementary]

⇒ ∠SON + ∠TSM + ∠NSM + ∠OSN = 180°

⇒ 50° + 40° + ∠NSM + 40° = 180°

⇒ 90°+ 40°+ ∠NSM = 180°

⇒ 130° + ∠NSM = 180°

⇒ ∠NSM = 180° - 130° = 50°

OR

It is given that ∠PER = 25°

and ∠PRE = 30°

Also, ∠PEH = 25°

and ∠PRA = 30°[∵EP and PR are angle bisectors of ∠REH, and ∠ARE respectively]

Since, HARE is a trapezium,

Therefore, ∠E + ∠H = 180°[co-interior angles]

⇒∠PER + ∠PEH + ∠H = 180°

⇒ 25° + 25° + ∠H = 180°

⇒ 50°+ ∠H = 180°

⇒ ∠H = 130°

Similarly, ∠R + ∠A = 180°[co-interior angles]

⇒∠ERP + ∠PRA + ∠RAH = 180°

30° + 30° + ∠A = 180°

60°+ ∠A = 180°

∠A = 120°

Therefore, ∠EHA = 130°

and ∠HAR = 120°

38. Let the length of the model ship be x m and the height of the mast be y cm.

We form a table as shown below:

Length of the ship (in metres)	28	x
Height of the	12	9

mast		

More the length of the ship, more would be the length of its mast. Hence, this is a case of direct proportion. That is,

$\frac{x_1}{y_1} = \frac{x_2}{y_2}$

$\therefore \frac{28}{12} = \frac{x}{9}$

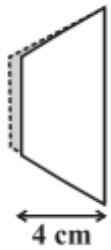
$\therefore$ 12x = 28 $\times$ 9

$x = \frac{28 \times 9}{12}$

$\therefore$ x = 21

Hence, the length of the model ship is 21 m.

39. **Aman's method:** Since it is a hexagon so, NQ divides the hexagon into two congruent trapeziums. We can verify it by paper folding (Fig.)



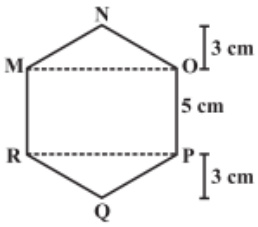
Now area of trapezium MNQR = $4 \times \frac{(11+5)}{2}$

$= 32\text{cm}^2$

So, the area of hexagon MNOPQR = 2 $\times$ 32

= 64 cm^2.

Ridhima's method: $\triangle$ MNO and $\triangle$ RPQ are congruent triangles with altitude 3 cm (Fig.)



We can verify this by cutting off these two triangles and placing them on one another.

Area of $\triangle$ MNO = $\frac{1}{2} \times 8 \times 3$

= 12 cm^2

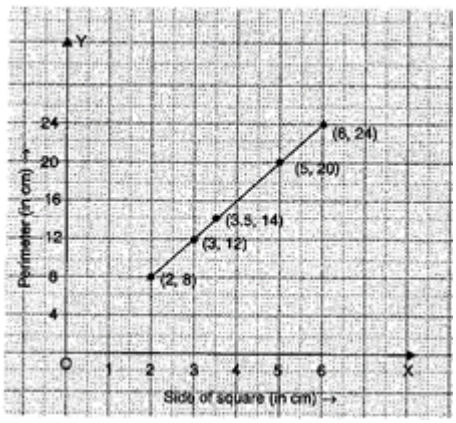
So, Area of $\triangle$ RPQ = = 12 cm^2

Area of rectangle MOPR = 8 $\times$ 5

= 40 cm^2

Now, area of hexagon MNOPQR = 40 + 12 + 12

= 64 cm^2

40. 

i. Scale :

Horizontal : 1 unit = 1 cm

Vertical : 1 unit = 4 cm

ii. Mark side of the square (in cm) on horizontal axis.

iii. Mark perimeter (in cm) on vertical axis.

iv. Plot the points (2, 8), (3, 12), (3.5, 14), (5, 20) and (6, 24).

v. Join the points.

We get a line graph.