Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 7

Time Allowed: 2 hours and 59 minutes **Maximum Marks: 80**

Section A

1. 42(4 + 2) = (42 × 4) + (42 × 2) is an example of **[1]**

   a) distributive property b) associative property

   c) closure property d) commutative property

2. A number which cannot be written in the form $\frac{p}{q}$, where p and q are integers and q ≠ 0 is called a _____. **[1]**

   a) negative number b) none of these

   c) rational number d) irrational number

3. If 8x - 3 = 25 + 17x, then x is **[1]**

   a) a rational number b) an integer

   c) a fraction d) none of these

4. Solve: 3(t - 3) = 5(2t + 1) **[1]**

   a) 2 b) -2

   c) 3 d) None of these

5. If angles P, Q, R and S of the quadrilateral PQRS; taken in order, are in the ratio 3 : 7 : 6 : 4, then PQRS is a **[1]**

   a) parallelogram b) trapezium

   c) kite d) rhombus

6. The sides of a rectangle are 2 m and 1.5 m. The length of its diagonal is **[1]**

   a) 25 m b) 6.25 m

   c) 6.5 m d) 2.5 m

7. One letter is chosen at random from the letters of the word **NITISH**. The probability of getting T is **[1]**

   a) $\frac{2}{5}$ b) $\frac{1}{2}$

   c) $\frac{1}{3}$ d) $\frac{1}{6}$

8. The area of a square plot is $101\frac{1}{400}$ m^2. Find the length of one side of the plot. **[1]**

   a) $10\frac{1}{20}$ m b) $13\frac{2}{5}$ m

   c) $12\frac{5}{6}$ m d) $12\frac{1}{6}$ m

9. A gardener arranges plants in rows to form a square. He finds that in doing so 15 plants are left out. If the total number of plants are 3984, the number of plants in each row are, **[1]**

   a) 62 b) 63

c) 64 d) None of these.

10. The unit's digit of the cube of a number is 9. The unit's digit of its cube root is _____. **[1]**

a) 1 b) 3

c) 7 d) 9

11. The number of Zeroes at the end of the cube of the number 20 is **[1]**

a) 2 b) 3

c) 6 d) 1

12. The list price of a shirt is Rs 300. A discount of 12% is announced on sales. What is the amount of discount on it? **[1]**

a) Rs 36 b) Rs 30

c) None of these d) Rs 33

13. By using identity find (a + 1) (a +2) = ? **[1]**

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

c) $a^2 + 3a + 2$ d) 3a + 2

14. By how much is the sum of (a - 5)(a - 2) and $a^2 + 6a + 7$ is greater than $-a^2 - 2a + 1$? **[1]**

a) $3a^2 + a + 16$ b) $a^2 - a - 16$

c) $2a^2 + a + 16$ d) $a^2 - a + 16$

15. The total surface area of a cube is 1014 ft^2. What is the length of its edge? **[1]**

a) 11 ft b) 9 ft

c) 15 ft d) 13 ft

16. The value of $(64)^{-2/3} \times (27)^{-2/3}$ is- **[1]**

a) $\frac{1}{144}$ b) $\frac{1}{145}$

c) $\frac{1}{441}$ d) $\frac{1}{414}$

17. If $\frac{(x^3)^2 \times x^4}{x^{10}} = x^p$, then the value of p will be- **[1]**

a) 0 b) 1

c) 2 d) 3

18. Two positive numbers x and y are inversely proportional. If x increases by 20%, then percentage decrease in y is **[1]**

a) $16\frac{2}{3}$ b) $1\frac{9}{11}$

c) 5 d) 20

Section B

19. **Assertion (A):** If $25^2 = 625$, then the square root of 625 is 125. **[1]**

Reasons (R): The square root is the number that we need to multiply by itself to get the original number.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** The cost of a trouser at a shop was 500. The sales tax charged was 6%. Then the bill amount will be ₹ 530. **[1]**

Reason (R): Bill amount= cost+ sales tax

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section C

21. Solve the linear equation $\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$. **[2]**

22. Find the cube root of 64 by prime factorisation method. **[2]**

23. What should be added to 4c(-a + b + c) to obtain 3a(a + b + c) - 2b (a - b + c)? **[2]**

24. Find the value of x in the expression $2^x + 2^x + 2^x = 192$ **[2]**

25. The table shows the data collected for Dhruv's walking on a road. **[2]**

Time (in minutes)	0	5	10	15	20	25
Distance (in km)	0	0.5	1	1.25	1.5	1.75

i. Plot a line graph for the given data using a suitable scale.

ii. In what time periods did Dhruv make the most progress?

26. Draw a graph for the points given. Is it a linear graph? **[2]**

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

27. Four friends had a competition to see how far could they hop on one foot. The table given shows the distance covered by each. **[3]**

Name	**Distance covered (in km)**
Seema	$\frac{1}{25}$
Nancy	$\frac{1}{32}$
Megha	$\frac{1}{40}$
Soni	$\frac{1}{20}$

a. How farther did Soni hop than Nancy?

b. What is the total distance covered by Seema and Megha?

c. Who walked farther, Nancy or Megha?

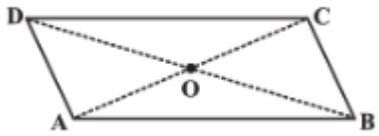
28. Given a parallelogram ABCD. Complete each statement along with the definition or property used. **[3]**

i. AD = _____

ii. ∠DCB = _____

iii. OC = _____

iv. m∠DAB + m∠CDA = _____



29. Find the least number which must be added to 252 so as to get a perfect square. Also find the square root of the perfect square so obtained. **[3]**

30. 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]**

31. Add $p^3 - 1$, $p^3 + p + 2$ and $p^2 - 2p + 1$. **[3]**

32. Find the height of cuboid whose base area is $180cm^2$ and volume is $900cm^3$. **[3]**

33. Here is a keyboard of a harmonium. **[3]**

a. Find the ratio of white keys to black keys on the keyboard.

b. What is the ratio of black keys to all keys on the given keyboard?

c. This pattern of keys is repeated on larger keyboard. How many black keys would you expect to find on a keyboard with 14 such patterns?

34. Factorise: $(l + m)^2 - (l - m)^2$ **[3]**

35. One of the diagonals of a rhombus and its sides are equal. Find the angles of the rhombus. **[4]**

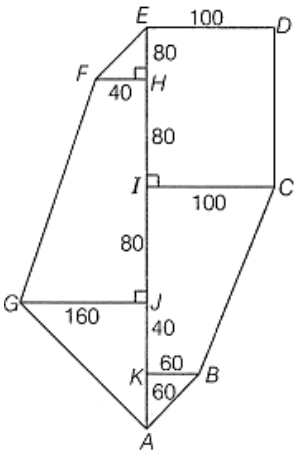
36. On a particular day, the sales (in rupees) of different items of a baker's shop are given below. **[4]**

ordinary bread	320
fruit bread	80
cakes and pastries	160
biscuits	120
others	40
Total	720

Draw a pie chart for this data

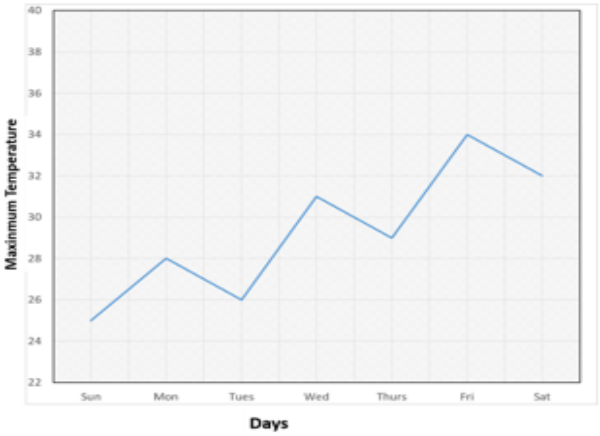
37. Fabina borrow ₹ 12500 at 12% per annum for 3 years at simple interest and Radha borrows the same amount for the same time period at 10% per annum, compounded annually. Who pays interest and by how much? **[4]**

38. Find the area of the following fields. All dimensions are in metres. **[4]**



39. Factorize $2x^2 + 5x + 3$. **[4]**

40. Study the graph and answer the questions that follow: **[4]**



a. What is the information obtained from the graph?

b. On which day was the temperature highest?

c. On which day was the temperature 32 °C

d. Which was the coldest day?

Solution

Section A

1. **(a)** distributive property
   Explanation: a(b + c) = (a × b) + (a × c) distributive property.

2. **(d)** irrational number
   Explanation: A number which cannot be written in the form of $\frac{p}{q}$, where p and q are integers and q is not equal to zero is called an irrational number for example $\sqrt{2}$, $\sqrt{3}$, ...

3. **(a)** a rational number
   Explanation: 8x - 3 = 25 + 17x
   8x - 17x = 25 + 3
   -9x = 28
   x = $\frac{28}{9}$; a rational number

4. **(b)** -2
   Explanation: 3(t - 3) = 5(2t + 1
   3t - 9 = 10t + 5
   10t - 3t = -9 - 5
   7t = -14
   t = 14 ÷ 7
   t = -2

5. **(b)** trapezium
   Explanation: Let the angles be 3x, 7x, 6x and 4x.
   ∴ 3x + 7x + 6x + 4x = 360^o
   or 20x = 360^o or x = 18^o.
   The angles are 54^o, 126^o, 108^o, 72^o.
   We see that adjacent angles are supplementary but opposite angles are not equal.
   Clearly, it is a trapezium.

6. **(d)** 2.5 m
   Explanation: Length of rectangle = 2 m and breadth =1.5 m
   ∴ Diagonal of rectangle
   = $\sqrt{(\text{ length })^2 + (\text{ breadth })^2}$
   = $\sqrt{(2)^2 + (1 \cdot 5)^2}$
   = $\sqrt{4 + 2 \cdot 25} = \sqrt{6 \cdot 25}$ = 2.5 m

7. **(d)** $\frac{1}{6}$
   Explanation: Total letters in word 'NITISH' = 6
   Total number of possible outcomes, n(S) = 6
   Number of favourable outcomes, n(E) = 1
   ∴ Required probability = $\frac{n(E)}{n(S)} = \frac{1}{6}$

8. **(a)** $10\frac{1}{20}$ m
   Explanation: Area of square = Side × Side
   $101\frac{1}{400}$ = Side^2

Side = $\sqrt{101\frac{1}{400}} = \sqrt{\frac{40401}{400}}$

201	40401
201	201
	1

2	400
2	200
2	100
2	50
5	25
5	5
	1

$= \sqrt{\frac{201\times201}{2\times2\times2\times2\times5\times5}} = \frac{201}{2\times2\times5}$

$= \frac{201}{20} = 10\frac{1}{20}$ m

9.

(b) 63

Explanation: Gardener arranges (3984 - 15) = 3969 plants in different rows to form a square. Let no. of plants in each row be 'x'

$\therefore x \times x = 3969$

$x^2 = 3969 \Rightarrow x = 63$

10.

(d) 9

Explanation: 9

11.

(b) 3

Explanation: $\because$ Number of zeroes at the end of the number 20 = 1

$\therefore$ Number of zeroes at the end of its cube = $3 \times 1 = 3$.

12. **(a)** Rs 36

Explanation: List Price of shirt = Rs 300

Discount (12%) = $\frac{300\times12}{100}$

= Rs 36

13.

(c) $a^2 + 3a + 2$

Explanation: use identity,

$(x + p)(x + q) = x^2 + (p + q)x + pq$

$(a + 1)(a + 2) = a^2 + (1 + 2)a + 1\times2$

$(a + 1)(a + 2) = a^2 + 3a + 2$

14. **(a)** $3a^2 + a + 16$

Explanation: Sum of $(a - 5)(a - 2) + (a^2 + 6a + 7)$

$= a^2 - 2a - 5a + 10 + a^2 + 6a + 7$

$= 2a^2 - 7a + 6a + 10 + 7$

$= 2a^2 - a + 17$

$\therefore 2a^2 - a + 1\,7 - (-a^2 - 2a + l)$

$= 2a^2 - a + 17 + a^2 + 2a - 1$

$= 3a^2 + a + 16$

15.

(d) 13 ft

Explanation: Total surface area of cube = 1014 ft^2 and let the side of cube be x ft

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

$1014 = 6(x)^2$

$\frac{1014}{6} = x^2$

$169 = x^2$

$\sqrt{169} = x$

13ft = x = side

the length is 13 ft.

16. **(a)** $\frac{1}{144}$

Explanation: $(64)^{-2/3} \times (27)^{-2/3} = \left(4^3\right)^{-2/3} \times \left(3^3\right)^{-2/3}$

$= \frac{1}{4^2 \times 3^2}$

$= \frac{1}{16 \times 9} = \frac{1}{144}$

17. **(a)** 0

Explanation: $\frac{\left(x^3\right)^2 \times x^4}{x^{10}} = x^p$

$\frac{x^{6+4}}{x^{10}} = x^p$

$x^0 = x^p$

p = 0

18. **(a)** $16\frac{2}{3}$

Explanation: $x \propto \frac{1}{y}$

$x = \frac{k}{y}$, k = constant

$\Rightarrow y = \frac{k}{x}$

When x increases by 20%

$x' = x + \frac{20(x)}{100} = \frac{6x}{5}$

$y' = \frac{k}{\left(\frac{6x}{5}\right)} = \frac{5k}{6x}$

Change in $y = \frac{5k}{6x} - \frac{k}{x} = \frac{-k}{6x}$

∴ Value of y decreases

% decrease in $y = \frac{\frac{k}{6x}}{\frac{k}{x}} \times 100$

$= \frac{1}{6} \times 100$

$= \frac{50}{3} = 16\frac{2}{3}$

Section B

19.

(d) A is false but R is true.

Explanation: If $25^2 = 625$, then the square root of 625 is 25. So, (A) is wrong.

The square root is the number that we need to multiply by itself to get the original number. It Is the correct statement.

20. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation: Cost = ₹ 500

Sales tax (5%) = $500 \times \frac{6}{100}$ = ₹ 30

Bill amount = 500 + 30 = ₹ 530.

Section C

21. $\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$ It is a linear equation since it involves linear expressions only.

∴ $\frac{6n-9n+10n}{12}$ = 21 ... [L.C.M. (2,4,6) = 12]

∴ $\frac{7n}{12}$ = 21

∴ n = $21 \times \frac{12}{7}$ ... [Multiplying both sides by $\frac{12}{7}$]

∴ n = 36 this is the required solution.

Verification,

L.H.S. $= \frac{1}{2} \times 36 - \frac{3}{4} \times 36 + \frac{5}{6} \times 36$

= 18 – 27 + 30

= 21

= R.H.S.

22.

2	64
2	32
2	16
2	8
2	4
2	2
	1

Prime factorisation of 64 is

$\underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2} \times \underline{2}$ [grouping the factors in triplets]

$= 2^3 \times 2^3 = (2 \times 2)^3 = 4^3$

Therefore, $\sqrt[3]{64} = 4$

23. Let x be added to the given expression

4c (-a + b + c) to obtain 3a(a + b + c) -2b(a - b + c)

i.e. x + 4c(-a + b + c) = 3a(a + b + c) -2b(a - b + c)

$\Rightarrow$ x = 3a(a + b + c) -2b(a - b + c) - 4c(- a + b + c)

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

$\Rightarrow x = 3a^2 + ab + 7ac + 2b^2 - 6bc - 4c^2$ [adding the like terms]

24. We have, $2^x + 2^x + 2^x = 192$

$= 2^x (1 + 1 + 1) = 192$

$= 3 \times (2^x) = 192$

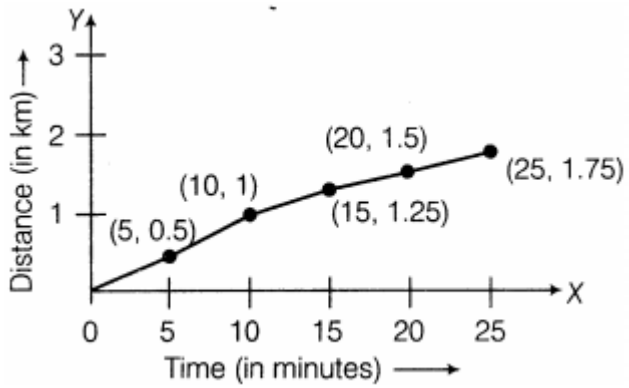
$\Rightarrow \quad 2^x = \frac{192}{3} = 64$

$\Rightarrow 2^x = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$\Rightarrow 2^x = 2^6$

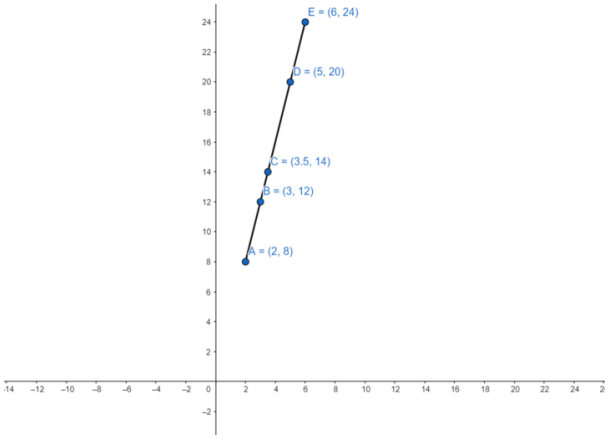
On comparing the powers of 2, we get x = 6

25. a.



b. Dhruv made the most progress from 0 to 5 min and from 5 to 10 min.

26. The given data can be represented in the form of graph as:



It is clear that points are in a straight line. Therefore, it is a linear graph.

27. We have, $\frac{1}{25}, \frac{1}{32}, \frac{1}{40}, \frac{1}{20}$

At first, we convert the numbers as like denominators.

2	25, 32, 40, 20
2	25, 16, 20, 10
2	25, 8, 10, 5
5	25, 4, 5 5
	5, 4, 1 1

Taking LCM of 25, 32, 40 and 20 = 2 × 2 × 2 × 5 × 5 × 4 = 800

we get,

$\frac{1}{25} = \frac{1\times32}{25\times32} = \frac{32}{800}, \frac{1}{32} = \frac{1\times25}{32\times25} = \frac{25}{800}; \frac{1}{40} = \frac{1\times20}{40\times20} = \frac{20}{800}$ and $\frac{1}{20} = \frac{1\times40}{20\times40} = \frac{40}{800}$

a. Soni hop more than Nancy $= \frac{40}{800} - \frac{25}{800} = \frac{40-25}{800} = \frac{15}{800} = \frac{3}{160}$

b. Total distance covered by Seema and Megha $= \frac{32}{800} + \frac{20}{800} = \frac{32+20}{800} = \frac{52}{800} = \frac{13}{200}$

c. It is clear that Nancy walked farther than Megha.

28. i. AD = BC [Opposite sides of a parallelogram are equal.]

ii. ∠DCB = ∠DAB [Opposite angles of a parallelogram are equal.]

iii. OC = OA [∵Diagonals of a parallelogram bisect each other]

iv. $m\angle DAB + m\angle CDA = 180^\circ$ [If two parallel lines are intersected by a transversal then the sum of the consecutive interior angles on the same sides of the transversal is 180°.]

29.
$$\begin{array}{r|l} & 15 \\ \hline 1 & \overline{2}\,\overline{52} \\ & -1 \\ \hline 25 & 1\,52 \\ & -1\,25 \\ \hline & 27 \end{array}$$

This shows that $15^2 < 252$

Next perfect square is $16^2 = 256$

Hence, the number to be added is $16^2 - 252 = 256 - 252 = 4$

Therefore, the perfect square so obtained is 252 + 4 = 256

Hence, $\sqrt{256} = 16$.

30. 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.

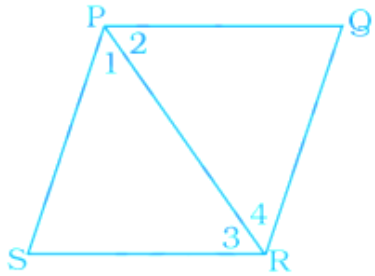
31.
$$\begin{array}{rr} & p^3 \quad -1 \\ + & p^3 \quad +p+2 \\ + & \quad p^2-2p+1 \\ \hline & 2p^3+p^2-p+2 \end{array}$$

32. The base of the cuboid is in the form of a rectangle.
Area of base = length × breadth
180 cm^2 = length × breadth
Volume = length × breadth × height
900 = 180 × height
Height = 900\180
Height = 5cm

33. According to the given figure in the question,
    a. The total number of black keys = 7
    The total number of white keys = 10
    Hence, the ratio of white keys to black keys on the keyboard = $\frac{10}{7}$
    b. The total number of keys = 10 + 7 = 17
    The ratio of black keys to total keys on the given keyboard = $\frac{7}{17}$
    c. Black keys in 1 keyboard = 7
    Black keys in 14 such keyboards = 14 × 7 = 98 keys

34. $(l + m)^2 - (l - m)^2$
= l{(l + m) – (l – m)} {(l + m) + (l – m)} . . . . [Applying Identity III
= (2m) (2l)
= 4lm

35. It is given that PQRS is a rhombus such that its diagonal PR is equal to its sides, i.e. PQ = QR = RS = PS = PR So, △PRS and △PQR are equilateral.

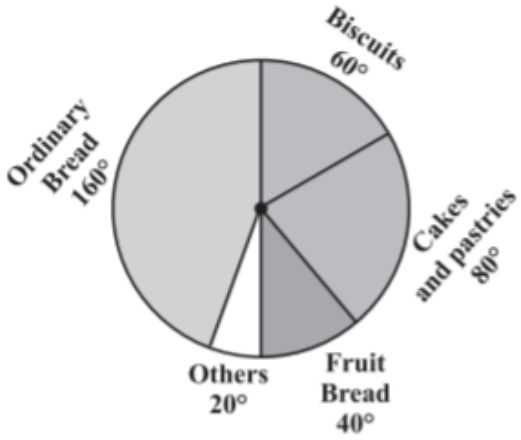


∠S = ∠Q = 60^o [∵Each angle of an equilateral triangle is 60^o]
and ∠P = ∠1 + ∠2
= 60^o + 60^o
= 120^o
∠R = ∠P = 120^o[Opposite angles of parallelogram]
Hence ∠S = ∠Q = 60^o
and ∠P = ∠R = 120^o

36. We find the central angle of each sector. Here the total sale = ₹720. We thus have this table.

Item	**Sales (in ₹)**	**In Fraction**	**Central Angle**
ordinary bread	320	$\frac{320}{720} = \frac{4}{9}$	$\frac{4}{9} \times 360^\circ = 160^\circ$
fruit bread	80	$\frac{120}{720} = \frac{1}{6}$	$\frac{1}{6} \times 360^\circ = 60^\circ$
cakes and pastries	160	$\frac{160}{720} = \frac{2}{9}$	$\frac{2}{9} \times 360^\circ = 80^\circ$
biscuits	120	$\frac{80}{720} = \frac{1}{9}$	$\frac{1}{9} \times 360^\circ = 40^\circ$
others	40	$\frac{40}{720} = \frac{1}{18}$	$\frac{1}{18} \times 360^\circ = 20^\circ$

Now, we make the pie chart (fig)



37. **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

38. We have,

Area of the given figure = Area of ΔEFH + Area of rectangle EDCI + Area of trapezium FHJG + Area of trapezium ICBK + Area of ΔGJA + Area of ΔKBA

Now, Area of $\Delta EFH = \frac{1}{2} \times \text{ Base } \times \text{ Height}$

$= \frac{1}{2} \times 40 \times 80$

$= 1600\text{m}^2$

Area of rectangle EDCI = Length × Breadth = 100 × 160

= 16000 m^2

Area of trapezium, FHJG = $\frac{1}{2} \times [\text{ Sum of parallel sides }] \times \text{ Height}$

$= \frac{1}{2} \times [40 + 160] \times 160$

$= \frac{200}{2} \times 160$

$= 100 \times 160$

= 16000m^2

Area of trapezium, ICBK = $\frac{1}{2} \times [\text{ Sum of parallel sides }] \times \text{ Height}$

$= \frac{1}{2} \times [60 + 100] \times 120$

$= \frac{1}{2} \times 160 \times 120$

$= 80 \times 120$

$= 9600\text{m}^2$

Area of $\Delta\text{AJG} = \frac{1}{2} \times \text{ Base } \times \text{ Height}$

$= \frac{1}{2} \times 160 \times 100$

= 80 × 100

= 8000 m^2

Area of $\Delta KBA = \frac{1}{2} \times$ Base $\times$ Height

= $\frac{1}{2} \times 60 \times 60$

= 1800m^2

Therefore, the area of the complete figure = 1600 + 16000 + 16000 + 9600 + 8000 + 1800

= 53000 m^2

39. The given expression is $2x^2 + 5x + 3$

Here, coefficient of x^2 = 2, coefficient of x = 5 and constant term = 3

We shall now split up the coefficient of the middle term i.e. 5 into two parts such that their sum is 5 and product equal to the product of coefficient of x^2 and constant term i.e. 2 × 3 = 6. Clearly 2 + 3 = 5 and 2 × 3 = 6. So, we replace the middle term 5x by 2x + 3x

Thus we have

$2x^2 + 5x + 3 = 2x^2 + 2x + 3x + 3$

$= (2x^2 + 2x) + (3x + 3)$

= 2x(x + 1) + 3(x + 1)

= (x + 1)(2x + 3)

40. a. The graph shows “Max temperature of the days of a week”

b. Friday

c. Saturday

d. Sunday