Class VIII Session 2024-25
Subject - Mathematics
Sample Question Paper - 7

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. Which of the following statements is correct? **[1]**

   i. 0 is called the additive identity for rational numbers.

   ii. 1 is called the multiplicative identity for rational numbers

   iii. The additive inverse of 0 is zero itself.

   iv. All of these

   a) Option (iv) b) Option (i)

   c) Option (iii) d) Option (ii)

2. Simplify: $\frac{\left(-18\frac{1}{3}\times 2\frac{8}{11}\right)-\left(4\frac{5}{7}\times 2\frac{1}{3}\right)}{\left|\frac{3}{5}+\left(\frac{-9}{10}\right)\right|+\left|-\left(\frac{-3}{5}\right)\right|}$ **[1]**

   a) $63\frac{4}{81}$ b) $-23\frac{7}{9}$

   c) $-67\frac{7}{9}$ d) $12\frac{6}{17}$

3. The value of x for which the expressions 3x - 4 and 2x + 1 become equal is **[1]**

   a) 5 b) -3

   c) 0 d) 1

4. Given that $\frac{-6p-9}{3} = \frac{2p+9}{5}$, the value of p is **[1]**

   a) -2 b) 3

   c) -4 d) 5

5. A parallelogram each of whose angles measures 90^o is _____. **[1]**

   a) rectangle b) trapezium

c) kite

d) rhombus

6. Find the number of sides of a regular polygon whose each exterior angle has a measure of 30^o. **[1]**

a) 15

b) 13

c) 12

d) 14

7. Which one of the following is not perfect square? **[1]**

a) $4^5 \times 5^5 \times 20$

b) $4^6 \times 5^6 \times 6^6$

c) $4^4 \times 5^4 \times 6^4$

d) $4^4 \times 5^5 \times 6^6$

8. The number of digits in the square root of 298116 is **[1]**

a) 6

b) 5

c) 3

d) 4

9. If cube root of 175616 is 56, then the value of $\sqrt[3]{175.616} + \sqrt[3]{0.175616} + \sqrt[3]{0.000175616}$ is **[1]**

a) 6.116

b) 6.216

c) 0.168

d) 62.16

10. Find the compound interest on ₹ 2,000 for 2 years at 10% per annum compounded annually. **[1]**

a) ₹ 420

b) ₹ 350

c) ₹ 2350

d) ₹ 2450

11. If x% of y is 100 and y% of z is 200, then **[1]**

a) z = 2x

b) z = $\frac{x}{4}$

c) z = 3x

d) z = $\frac{x}{3}$

12. Subtract $5x^2 - 4y^2 + 6y - 3$ from $7x^2 - 4xy + 8y^2 + 5x - 3y$. **[1]**

a) $2x^2 - 4xy + 12y^2 + 5x - 9y + 3$

b) $2x^2 - 4xy + 12y^2 + 5x$

c) $2x^2 - 4xy + 12y^2 + 5x - 9y$

d) 5x - 9y + 3

13. The sum of -7pq and 2pq is: **[1]**

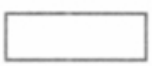
a) 5 pq

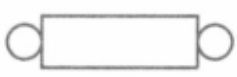
b) - 9 pq

c) 9 pq

d) -5 pq

14. Which of the following is the net of a cylinder? **[1]**

a) 

b) 

c) 

d) 

15. The capacity of a closed cylindrical water tank is 46.2 kilolitres. If the height of the cylinder is 1.2 m, then what is its radius? **[1]**

a) 30 m

b) 3.5 m

c) 20 m

d) 2.8 m

16. Simplify: $\frac{\sqrt{216}+\sqrt{96}}{\sqrt{50^2-10^2}}$ **[1]**

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

c) $\frac{1}{4}$ d) 1

17. Evaluate the exponential expression $(-n)^4 \times (-n)^2$, for n = 5. **[1]**

a) 25 b) 625

c) 3125 d) 15625

18. If 6 men and 8 boys can do a piece of work in 10 days and 26 men and 48 boys can do the same work in 2 days, the time taken by 15 men and 20 boys to do the same type of work will be **[1]**

a) 4 days b) 7 days

c) 6 days d) 8 days

19. Simplify $\frac{49a^4b^6c^8}{7a^2b^2c^2}$ **[1]**

a) $7a^4b^4c^6$ b) $7a^2b^2c^2$

c) $7a^4b^2c^6$ d) $7a^2b^4c^6$

20. Simplified from of $\frac{(-6a^3b^5)(2a^2b^3)}{-18a^4b^8c^3}$ **[1]**

a) $\frac{2a}{3c^3}$ b) $\frac{-2a^2b}{3c^3}$

c) $\frac{2a^2b}{3bc^3}$ d) $\frac{-2ab}{3c^3}$

Section B

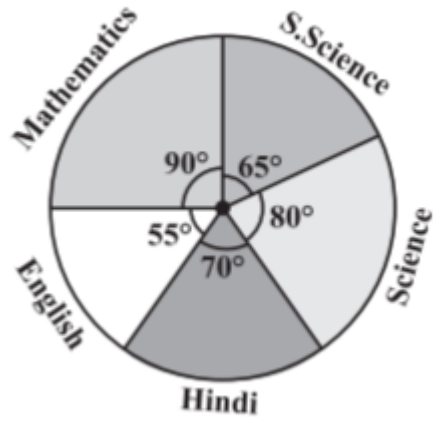
21. Solve the linear equation: $m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$ **[2]**

22. The measure of two adjacent angles of a parallelogram are in the ratio 3 : 2. Find the measure of each of the angles of the parallelogram. **[2]**

OR

Both the pairs of opposite angles of a quadrilateral are equal and supplementary. Find the measure of each angle.

23. The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the question. **[2]**



Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi. (Hint: Just study the central angles).

24. Using prime factorisation, find the cube root of 5832. **[2]**

[2]

25. Add: $4y(3y^2 + 5y - 7)$ and $2(y^3 - 4y^2 + 5)$

OR

The cost of a chocolate is ₹(x + 4) and Rohit bought (x + 4) chocolates. Find the total amount paid by him in terms of x. If x = 10.

26. Draw a prism with its base as regular hexagon with one of its face facing you. Now draw the top view, front view and side view of this solid. **[2]**

27. Verify commutative property of multiplication if x = 2 and $y = \frac{-7}{8}$. **[3]**

28. Solve the linear equation $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$. **[3]**

29. Find the value of $\sqrt{\sqrt{144} + \sqrt{25}}$ **[3]**

OR

Find the number of plants in each row, if 1024 plants are arranged, so that number of plants in a row is the same as the number of rows.

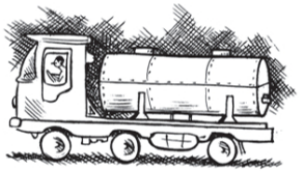
30. Three bags contain 64.2 kg of sugar. The second bag contains $\frac{4}{5}$ of the contents of the first and the third contains $45\frac{1}{2}\%$ of what there is in the second bag. How much sugar is there in each bag? **[3]**

31. The product of two expressions is $x^5 + x^3 + x$. If one of them is $x^2 + x + 1$, find the other. **[3]**

32. Four times the area of the curved surface of a cylinder is equal to 6 times the sum of the areas of its bases. If its height is 12 cm, find its curved surface area. **[3]**

OR

A milk tank is in the form of cylinder whose radius is 1.5 m and length is 7 m. Find the quantity of milk in litres that can be stored in the tank?



33. Find the value of : $\left\{\left(\frac{-2}{3}\right)^{-2}\right\}^2$ **[3]**

34. Divide: $24(x^2yz + xy^2z + xyz^2)$ by 8xyz. **[3]**

35. PQRS is a rectangle. The perpendicular ST from S on PR divides ∠S in the ratio 2 : 3. Find ∠TPQ. **[4]**

OR

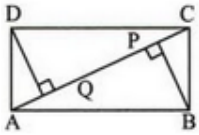
In the given rectangle ABCD, BP and DQ are perpendiculars to AC from B and D respectively/ Answer the following and give reasons for your answers.

i. Is AD = BC?

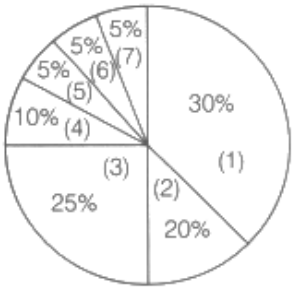
ii. Is ∠BAP = ∠DCQ ?

iii. Is ΔDAQ ≅ ΔBCP?

iv. Is BP = DQ?



36. A financial counselor gave a client this pie chart describing how to budget his income. If the client brings home 50000 each month, how much should he spend in each category? **[4]**



1. Housing
2. Food (including eating out)
3. Car loan and maintenance
4. Utilities
5. Phone
6. Clothing
7. Entertainment

OR

The following data represents the approximate percentage of water in various oceans. Prepare a pie chart of the given data.

Ocean	**Percentage of water**
pacific	40%
Atlantic	30%
Indian	20%
Others	10%

37. Given, principal = ₹40000, rate of interest = 8% per annum compounded annually. Find **[4]**

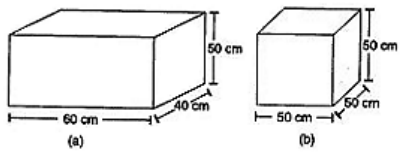
i. Interest if period is one year.

ii. Principal for IInd year.

iii. Interest for IInd year.

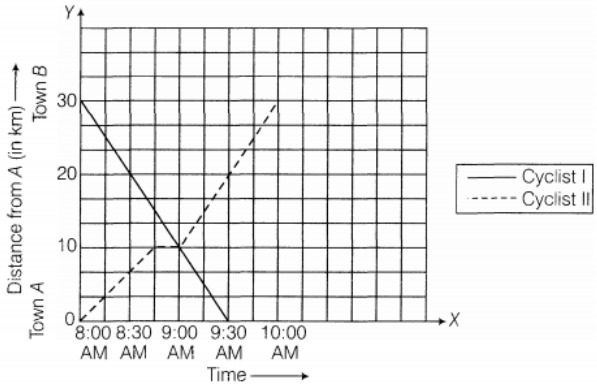
iv. Amount if period is two year.

38. There are two cuboidal boxes as shown in the adjoining figure. Which box requires the least amount of material to make? **[4]**



39. The cost of 5 metres of a particular quality of cloth is ₹210. Tabulate the cost of 2, 4, 10 and 13 metres of cloth of the same type. **[4]**

40. The following graph shows the journey made by two cyclists, one from town A to B and the other from town B to A. **[4]**



a. At what time did cyclist II rest? How long did the cyclist rest?

b. Was cyclist II cycling faster or slower after the rest?

c. At what time did the two cyclists meet?

d. How far had cyclist II travelled when he met cyclist I?

e. When cyclist II reached town A, how far was cyclist I from town S?

Solution

Section A

1. **(a)** Option (iv)
   Explanation: All the given statements are correct.

2. **(c)** $-67\frac{7}{9}$
   Explanation: We have, $\frac{\left(-18\frac{1}{3}\times 2\frac{8}{11}\right)-\left(4\frac{5}{7}\times 2\frac{1}{3}\right)}{\left|\frac{3}{5}+\left(\frac{-9}{10}\right)\right|+\left|-\left(\frac{-3}{5}\right)\right|}$
   $= \frac{\left(\frac{-55}{3}\times\frac{30}{11}\right)-\left(\frac{33}{7}\times\frac{7}{3}\right)}{\left|\frac{3}{5}-\frac{9}{10}\right|+\left|\frac{3}{5}\right|} = \frac{-50-11}{\left|\frac{6-9}{10}\right|+\frac{3}{5}}$
   $= \frac{-61}{\frac{3}{10}+\frac{3}{5}} = \frac{-61}{\frac{3+6}{10}} = \frac{-61\times 10}{9} = \frac{-610}{9} = -67\frac{7}{9}$

3. **(a)** 5
   Explanation: When the value of x is 5 then both the expressions will be equal.
   Proof
   3x - 4 = 2x + 1
   x = 5

4. **(a)** -2
   Explanation: $\frac{-6p-9}{3} = \frac{2p+9}{5}$
   $\Rightarrow$ 5(-6p - 9) = 3(2p + 9)
   $\Rightarrow$ -30p - 45 = 6p + 27
   $\Rightarrow$ -30p - 6p = 45 + 27
   $\Rightarrow$ -36p = 72
   $\Rightarrow$ p = -2

5. **(a)** rectangle
   Explanation: A rectangle is a type of parallelogram in which all the four angles are of 90^0 but the opposite sides are equal.

6. **(c)** 12
   Explanation: Number of sides
   n = $\frac{360^0}{30^0}$
   = 12

7. **(d)** $4^4 \times 5^5 \times 6^6$
   Explanation: $4^4 \times 5^5 \times 6^6$
   = = $\underline{4\times 4}\times\underline{4\times 4}\times\underline{5\times 5}\times\underline{5\times 5}\times 5\times\underline{6\times 6}\ \times\underline{6\times 6}\times\underline{6\times 6}$
   Since each factor cannot be paired. So, is not a perfect square.

8. **(c)** 3

Explanation:

2	298116
2	149058
3	74529
3	24843
7	8281
7	1183
13	169
13	13
	1

$\Rightarrow \sqrt{298116} = 2 \times 3 \times 7 \times 13$

= 546

∴ Number of digits = 3

9.

(b) 6.216

Explanation: $\sqrt[3]{175.616} + \sqrt[3]{0.175616} + \sqrt[3]{0.000175616}$

= 5.6 + 0.56 + 0.056 = 6.216

10. **(a)** ₹ 420

Explanation: C.I. = $2000\left(1 + \frac{10}{100}\right)^2$ - 2000 = $2000 \times \frac{11}{10} \times \frac{11}{10}$ - 2000

= ₹ (2420 - 2000) = ₹ 420

11. **(a)** z = 2x

Explanation: It is given that x% of y = 100

$\Rightarrow \frac{xy}{100} = 100 \Rightarrow$ xy = 10000 $\Rightarrow$ y = $\frac{10000}{x}$

Also, y% of z = 200

$\Rightarrow \frac{yz}{100} = 200 \Rightarrow$ yz = 20000

$\Rightarrow \left(\frac{10000}{x}\right) z = 20000$

$\Rightarrow \frac{z}{x} = 2$ or z = 2x

12. **(a)** $2x^2 - 4xy + 12y^2 + 5x - 9y + 3$

Explanation: $(7x^2 - 4xy + 8y^2 + 5x - 3y) - (5x^2 - 4y^2 + 6y - 3)$

opening brackets we get,

$7x^2 - 4xy + 8y^2 + 5x - 3y - 5x^2 + 4y^2 - 6y + 3$

solving like terms we get,

$7x^2 - 4xy + 8y^2 + 5x - 3y - 5x^2 + 4y^2 - 6y + 3$

$7x^2 - 5x^2 + 8y + 4y^2 + 5x - 3y - 6y - 4xy + 3$

$2x^2 + 12y^2 + 5x - 9y - 4xy + 3$

$2x^2 - 4xy + 12y^2 + 5x - 9y + 3$

13.

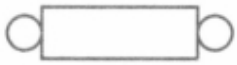
(d) -5 pq

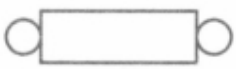
Explanation: Given, monomials are -7pq and 2pq.

∴Their sum = - 7pq + 2pq = (-7 + 2) pq [both monomials consist of like terms, so adding their numerical coefficient]

= -5 pq

14.

(b) 

Explanation: 

15.

(b) 3.5 m

Explanation: Volume of cylindrical tank = 46.2 kL

= 46200 L = $\left(\frac{46200}{1000}\right)$m^3 = 46.2 m^3

Height of tank (h) = 1.2 m

Let r be the radius. Then, $\pi r^2 h$ = 46.2

$\Rightarrow \frac{22}{7} \times r^2 \times 1.2 = 46.2$

$\Rightarrow r^2 = 12.25$

$\Rightarrow$ r = 3.5 m

16. **(a)** $\frac{1}{2}$

Explanation: $\frac{1}{2}$

17.

(d) 15625

Explanation: $(-5)^4 \times (-5)^2$

$= 625 \times 25$

= 15625

18. **(a)** 4 days

Explanation: Given$(6M + 8 B) \times 10 = (26M + 48B) \times 2$

$\Rightarrow$ 60 M + 80 B = 52 M + 96 B

$\Rightarrow$ 8 M = 16 B

$\Rightarrow$ 1 M = 2 B

$\therefore$ 15 M + 20 B = 30 B + 20 B = 50 B

6 M + 8 B = 12 B + 8 B = 20 B

Now

Boys	Days
20	10
50↓	x (Let)

$\therefore x = \frac{20 \times 10}{50}$ = 4 days

19.

(d) 7a^{2}b^{4}c^6

Explanation: $\frac{49a^4b^6c^8}{7a^2b^2c^2}$

= 7a$^{4-2}$ b$^{6-2}$ c$^{8-2}$

= 7a^{2}b^{4}c^6

20. **(a)** $\frac{2a}{3c^3}$

Explanation: $\frac{\left(-6a^3b^5\right)\left(2a^2b^3\right)}{-18a^4b^8c^3}$

$= \frac{12}{18}\frac{a^{3+2}b^{5+3}}{a^4b^8c^3}$

$= \frac{2}{3}\frac{a^5b^8}{a^4b^8c^3} = \frac{2}{3}\frac{a}{c^3}$

Section B

21. 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.

22. Let the two adjacent angles be 3x° and 2x°.

Then,

3x° + 2x° = 180° (∵ Sum of the two adjacent angles of a parallelogram is 180°)

$\Rightarrow$ 5x° = 180°

$\Rightarrow x^\circ = \frac{180^\circ}{5}$

$\Rightarrow$ x° = 36°

$\Rightarrow$ 3x° = 3 × 36° = 108°

and 2x° = 2 × 36° = 72°

Since, the opposite angles of a parallelogram of equal measure, therefore the measures of the angles of the parallelogram are 72°, 108°, 72° and 108°.

OR

Let ABCD be a quadrilateral, such that

∠A = ∠C, ∠B = ∠D and also ∠A + ∠C = 180°, ∠B + ∠D = 180°

Now, ∠A + ∠A= 180°

$\Rightarrow$ 2∠A = 180°

$\Rightarrow$ ∠A = 90°

Similarly, ∠B = 90°

Hence, each angle is a right angle.

23. From the graph it is clear that

Sum of the central angles for Social Science and Mathematics.

= 65° + 90°

= 155°

Sum of the central angles for Science and Hindi.

= 80° + 70°

= 150°

Hence, the sum of the marks obtained in Social Science and Mathematics is more than in Science and Hindi.

24. We have, The prime factorization of 5832 is

2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

5832 = 2 × 2 × 2 × 3 × 3 × 3 × 3 × 3 × 3

Therefore, $\sqrt[3]{5832} = \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

= 2 × 3 × 3

= 18

25. The first expression = $4y(3y^2 + 5y - 7) = (4y \times 3y^2) + (4y \times 5y) + (4y \times (-7)) = 12y^3 + 20y^2 - 28y$

The second expression = $2(y^3 - 4y^2 + 5) = 2y^3 + 2 \times (-4y^2) + 2 \times 5 = 2y^3 - 8y^2 + 10$

Adding the two expressions,

$$\begin{array}{rrrrr} & 12y^3 & + & 20y^2 - 28y & \\ + & 2y^3 & - & 8y^2 & + 10 \\ \hline & 14y^3 & + & 12y^2 - 28y & + 10 \end{array}$$

Thus, the sum is $14y^3 + 12y^2 - 28y + 10$

OR

Given, cost of a chocolate = ₹ (x + 4)

Rohit bought (x + 4) chocolates

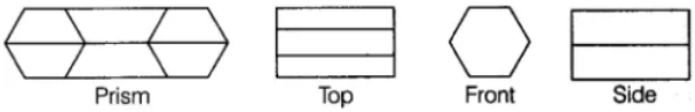
∴ The cost of (x + 4)chocolates = Cost of one chocolate × Number of chocolates = (x + 4)(x + 4)= $(x + 4)^2$

∴ The total amount paid by Rohit = ₹(x^2 + 8x + 16) [∵ $(a + b)^2 = a^2 + 2ab + b^2$]

Now, if x = 10. Then, the amount paid by Rohit = $10^2 + 8 \times 10 + 16 = 100 + 80 + 16$ = ₹196

26. The following figure shows a prism with its base as a regular hexagon with one of its faces to us.

And also, we show the top view, front view and side view of the prism.



27. Commutative property of multiplication is x × y = y × x

L.H.S

$2 \times \frac{-7}{8} = \frac{-14}{8}$

R.H.S

$\frac{-7}{8} \times 2 = \frac{-14}{8}$

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

Hence, verified.

28. $\frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$ It is a linear equation since it involves linear expressions only.

$\therefore \frac{3}{4}t - \frac{2}{4} - \frac{2}{3}t - \frac{3}{3} = \frac{2}{3} - t$

$\therefore \frac{3}{4}t - \frac{1}{2} - \frac{2}{3}t - 1 = \frac{2}{3} - t$

$\therefore \frac{3}{4}t - \frac{2}{3}t + t = \frac{2}{3} + \frac{1}{2} + 1$ ... [Transposing –t to L.H.S. and $-\frac{1}{2}$ and –1 to R.H.S.]

$\therefore \frac{9t-8t+12t}{12} = \frac{4+3+6}{6}$

$\therefore \frac{13t}{12} = \frac{13}{6}$

$\therefore t = \frac{13}{6} \times \frac{12}{13}$ ... [Multiplying both sides by $\frac{12}{13}$]

∴ t = 2 this is the required solution.

29. $\sqrt{\sqrt{144} + \sqrt{25}}$

$= \sqrt{\sqrt{3 \times 3 \times 4 \times 4} + \sqrt{5 \times 5}}$

$\sqrt{3 \times 4 + 5}$

$\sqrt{17}$

OR

Let the number of plants in each row be x.

Then, number of rows = number of plants in each row = x

	32
3	$\overline{10}\,\overline{24}$
	9
62	124
	124
	0

Total plants = x × x = x^2

According to the question, x^2 = 1024

$\Rightarrow x = \sqrt{1024} = \sqrt{32 \times 32}$

∴ x = 32 Hence, there are 32 plants in each row.

30. We have given,

The total weight of sugar in three bags = 64.2 kg

Let the first bag contains x kg sugar

The second bag contains = $x \times \frac{4}{5}$kg

= $\frac{4x}{5}$kg

Third bag contains = $x \times \frac{4}{5} \times \frac{91}{2}\%$

= $x \times \frac{4}{5} \times \frac{\frac{91}{2}}{100}$

= $\frac{91x}{250}$kg

According to the question,

$x + \frac{4x}{5} + \frac{91x}{250}$ = 64.2

$\Rightarrow \frac{250x+200x+91x}{250}$ = 64.2

$\Rightarrow$ 541x = 64.2 $\times$ 250

541 x = 16050

$x = \frac{16050}{541}$

$x = 29.67\text{kg}$

So, the first bag contains the sugar = 23.73 kg

Second bag contains the sugar = $29.67 \times \frac{4}{5}$

$= 23.73\text{kg}$

and third bag contains the sugar = $\frac{91}{250} \times 29.67$

= 10.8kg

31. We have, product of two expressions $x^5 + x^3 + x$ and one is $x^2 + x + 1$

Let the other expression be A. Then, $A \cdot (x^2 + x + 1) = x^5 + x^3 + x$

$\Rightarrow \quad A = \frac{x^5+x^3+x}{x^2+x+1} = \frac{x\left(x^4+x^2+1\right)}{x^2+x+1}$

$\Rightarrow \quad A = \frac{x\left(x^4+2x^2-x^2+1\right)}{x^2+x+1} = \frac{x\left(x^4+2x^2+1-x^2\right)}{x^2+x+1}$ [adding and subtracting x^2 in numerator term

$= \frac{x\left[\left(x^4+2x^2+1\right)-x^2\right]}{x^2+x+1} = \frac{x\left[\left(x^2+1\right)^2-x^2\right]}{x^2+x+1}$

$= \frac{x\left(x^2+1+x\right)\left(x^2+1-x\right)}{x^2+x+1}$ [using the identity, $a^2 - b^2 = (a + b)(a - b)$]

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

Hence, the other expression is $x(x^2 - x + 1)$

32. Let the radius and height of the cylinder be r and h, respectively.

Curved surface area of cylinder = $2\pi rh$

Area of base = πr^2

Sum of areas of bases = $2\pi r^2$

According to the question, 4 $\times$ Curved surface area = 6 $\times$ Sum of areas of bases

$4 \times 2\pi rh = 6 \times 2\pi r^2$

$= 8\pi rh = 12\pi r^2$

$= 2h = 3r$

$\Rightarrow \quad r = \frac{2}{3}h$

$\therefore \quad r = \frac{2}{3} \times 12$ = 8cm [$\because$ h = 12 cm, given]

$\therefore$ Curved surface area of the cylinder = $2\pi rh$

$= 2 \times \frac{22}{7} \times 8 \times 12 = \frac{44 \times 8 \times 12}{7}$

= 603.428 cm^2

OR

For milk tank

r = 1.5 m

h = 7 m

$\therefore$ Capacity $= \pi r^2 h$

$= \frac{22}{7} \times 1.5 \times 1.5 \times 7$

$= \frac{22}{7} \times \frac{15}{10} \times \frac{15}{10} \times 7$

= 49.5 m^3

= 49.5 $\times$ 1000 L . . . . [$\because$ 1 m^3 = 1000 L]

= 49500 L

Hence, the quantity of milk that can be stored in the tank is 49500 litres.

33. $\left\{\left(\frac{-2}{3}\right)^{-2}\right\}^2$

$= \left(\frac{-2}{3}\right)^{(-2)\times 2}$

$= \left(\frac{-2}{3}\right)^{-4}$

$= \frac{(-2)^{-4}}{(3)^{-4}}$

$= \frac{3^4}{(-2)^4}$

$= \frac{3\times3\times3\times3}{(-2)\times(-2)\times(-2)\times(-2)}$

$= \frac{81}{16}$

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

34. 24 ($x^2yz + xy^2z + xyz^2$)

= 2 × 2 × 2 × 3 × [(x × x × y × z) + (x × y × y × z) + (x × y × z × z)]

= 2 × 2 × 2 × 3 × x × y × z × (x + y + z) [By taking out the common factor]

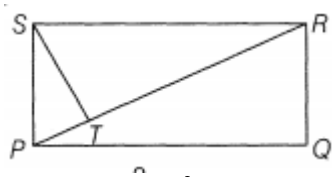
= 8 × 3 × xyz × (x + y + z)

Now, $24(x^2yz + xy^2z + xyz^2) \div 8xyz$

$= \frac{8\times3\times xyz\times(x+y+z)}{8\times xyz} = 3 \times (x + y + z) = 3(x + y + z)$

35. Given ST is perpendicular on PR and ST divides ∠S in the ratio 2 : 3

So, sum of ratio = 2 + 3 = 5



Now, $\angle TSP = \frac{2}{5} \times 90^\circ = 36^\circ, \angle TSR = \frac{3}{5} \times 90^\circ = 54^\circ$

$\angle TPS = 180^\circ - (\angle STP + \angle TSP)$ [by the angle sum property of a triangle]

= 180°-(90°+ 36°) =54°

We know that, $\angle SPQ = 90^\circ$

$\Rightarrow \angle TPS + \angle TPQ = 90^\circ$

$\Rightarrow \quad 54^\circ + \angle TPQ = 90^\circ$

$\Rightarrow \quad \angle TPQ = 90^\circ - 54^\circ = 36^\circ$

OR

i. Yes (opposite sides of a rectangle)

ii. Yes, since, AB ∥ CD, AC is a transversal and they are alternate angles.

iii. Since DQ and BP are perpendiculars from D and B, respectively on AC, therefore, ∠DQA = ∠BPC = 90°.

Thus DQ ∥ BP (if the alternate angles are equal the lines are parallel)

Also AD ∥ BC and AC is the transversal.

∴ ∠DAQ = ∠BCP (Alternate angles)

Since ∠DQA = ∠BPC and ∠DAQ = ∠BCP,

∴ ∠ADQ = ∠CBP

Now in ΔDAQ and ΔBCP, we have

∠DAQ = ∠BCP

∠ADQ = ∠CBP

DA = BC

∴ ΔDAQ ≅ ΔBCP (by ASA condition of congruence)

iv. Yes, (corresponding parts of congruent triangle ΔDAQ and ΔBCP)

36. Monthly income = ₹50000

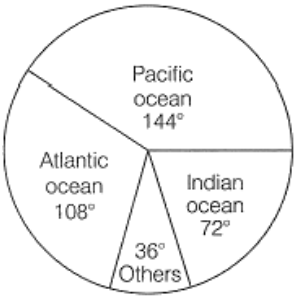
Category	Money spent
Housing	$\frac{30}{100} \times 50000$ = 15000
Food (including eating out)	$\frac{20}{100} \times 50000$ = 10000
Car loan and maintenance	$\frac{25}{100} \times 50000$ = 12500
Utilities	$\frac{10}{100} \times 50000$ = 5000
Phone	$\frac{5}{100} \times 50000$ = 2500
Clothing	$\frac{5}{100} \times 50000$ = 2500

Entertainment	$\frac{5}{100} \times 50000 = 2500$

OR

Ocean	Central angle
Pacific	$\frac{40}{100} \times 360^\circ = 144^\circ$
Atlantic	$\frac{30}{100} \times 360^\circ = 108^\circ$
Indian	$\frac{20}{100} \times 360^\circ = 72^\circ$
Others	$\frac{10}{100} \times 360^\circ = 36^\circ$

The pie chart is as follows:



37. We have given that principal (P)= ₹40000
Rate of interest (R) = 8% per annum

i. Compound interest for one year,
We know that, $A = P\left(1 + \frac{R}{100}\right)^n$
,= $40000\left(1 + \frac{8}{100}\right)^1 [\because n = 1yr]$
= $40000 \times \frac{108}{100}$
∴ Amount, A = 400×108
= ₹43200
∴ Compound interest, Cl = A - P
= ₹43200 - ₹40000
= ₹3200

ii. Amount of 1st year = Principal of IInd year
= ₹43200

iii. Now, for IInd year,
Principal = ₹43200
Rate of interest, R= 8% per annum
Time, n = 1 yr
Amount for llnd year = 43200
= $\left(1 + \frac{8}{100}\right)^1$
= $43200 \times \frac{108}{100}$
= ₹46656
Compound interest, Cl = A - P
= ₹46656 - ₹43200
= ₹3456

iv. Now, if period i.e. time (n) = 2 yr,
Principal = ₹ 40000
and rate (R) = 8% per annum
$\because \quad A = P\left(1 + \frac{R}{100}\right)^n$
$\Rightarrow \quad A = 40000\left(1 + \frac{8}{100}\right)^2$
$= 40000 \times \frac{108}{100} \times \frac{108}{100}$

= ₹46656

Therefore the total Amount, A = ₹46656

38. i. First Cuboidal Box

l = 60 cm

b = 40 cm

h = 50 cm

∴ Total surface area

= 2 (lb + bh + hl)

= 2 (60 × 40 + 40 × 50 + 50 × 60)

= 2 (2400 + 2000 + 3000)

= 2 (7400)

= 14800 cm^2

ii. Second Cuboidal Box

l = 50 cm

b = 50 cm

h = 50 cm

∴ Total surface area

= 2 (lb + bh + hl)

= 2 (50 × 50 + 50 × 50 + 50 × 50)

= 2 (2500 + 2500 + 2500)

= 2 (7500)

= 15000 cm^2

Hence, the box (a) requires the least amount of material to make.

39. Suppose the length of cloth is x metres and its cost, in ₹ is y

x	2	4	5	10	13
y	y_2	y_3	210	y_4	y_5

As the length of cloth increases, cost of the cloth also increases in the same ratio. It is a case of direct proportion.

We can use the relation of type $\frac{x_1}{y_1} = \frac{x_2}{y_2}$

i. Here x_1 = 5, y_1 = 210 and x_2 = 2

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

we get $\frac{5}{210} = \frac{2}{y_2}$

or 5 y_2 = 2 × 210

or $y_2 = \frac{2\times210}{5}$

y_2 = 84

ii. If x_3 = 4,

then $\frac{5}{210} = \frac{4}{y_3}$

or $5y_3$ = 4 × 210

or $y_3 = \frac{4\times210}{5}$

y_3 = 168

iii. If x_4 = 10,

then $\frac{5}{210} = \frac{10}{y_4}$

or $y_4 = \frac{10\times210}{5}$

y_4 = 420

iv. If x_5 = 13,

then $\frac{5}{210} = \frac{13}{y_5}$

or $y_5 = \frac{13\times210}{5}$

y_5 = 546

40. a. On the basis of the given graph, cyclist II rest at 8 : 45 AM for 15 min.

b. Cyclist II is cycling faster after rest as he has covered a distance of 20 km in 1h.

c. Both cyclists meet at 9:00 AM.

d. Cyclist II had travelled 20 km, when he met cyclist I.

e. When cyclist II reached town A, the cyclist I was 10 km from town B.