

Goa Board
Class VIII Mathematics
Sample Paper – 3 Solution

Time: 3 hours**Total Marks: 90**

Section A

1. Correct answer: B

$$20\% \text{ of } x = \frac{20}{100}x = \frac{x}{5}$$

2. Correct answer: A

Five vertices.

3. Correct answer: A

$$1^3 = 1$$

Thus, the natural number 1 is equal to its cube.

4. Correct answer : D

A rational number is a number of the form $\frac{p}{q}$ where $q \neq 0$. So in case of reciprocal of 0, denominator will be 0.

5. Correct answer: A

(P + Q + R) can together finish the work in $\frac{97}{11} = 8\frac{9}{11}$ days.

6. Correct answer: C

At $x = 3$, $y = 2(3) + 5 = 6 + 5 = 11$.

7. Correct answer: D

Let one number be x and the other number be $(80 - x)$.

From the given information, we have

$$\frac{x}{80 - x} = \frac{3}{5}$$

$$\Rightarrow 5x = 240 - 3x$$

$$\Rightarrow 5x + 3x = 240$$

$$\Rightarrow 8x = 240$$

$$\Rightarrow x = \frac{240}{8} = 30$$

Thus, the two numbers are 30 and $(80 - 30) = 50$.

Hence, the greatest number amongst the two is 50.

8. Correct answer: B
0 and 1

Section B

9. $82^2 = (80 + 2)^2$

In the property $(a + b)^2 = a^2 + b^2 + 2ab$, putting $a = 80$ and $b = 2$, we get:

$$\begin{aligned}(80 + 2)^2 &= 80^2 + 2^2 + 2 \times 80 \times 2 \\ &= 6400 + 4 + 320 \\ &= 6724\end{aligned}$$

10.

Total number of outcomes = $10 + 25 = 35$

Let E be the event of getting a prize.

Thus, number of outcomes favourable to event E = 10

$$\text{Hence, } P(E) = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}} = \frac{10}{35} = \frac{2}{7}$$

Thus, probability of getting a prize = $\frac{2}{7}$

11. $20a^2b + 30abc$

$$\begin{aligned}&= \underline{2} \times \underline{2} \times \underline{5} \times \underline{a} \times a \times \underline{b} + \underline{2} \times \underline{3} \times \underline{5} \times \underline{a} \times \underline{b} \times c \\ &= 2 \times 5 \times a \times b (2 \times a + 3 \times c) \\ &= 10ab (2a + 3c)\end{aligned}$$

12. Area of square = $(5a - 2b)^2$

We use the identity $(x - y)^2 = x^2 - 2xy + y^2$

Taking, $x = 5a$ and $y = 2b$

$$\text{We get, } (5a - 2b)^2 = (5a)^2 - 2(5a)(2b) + (2b)^2 = 25a^2 - 20ab + 4b^2$$

13. Steps of construction:

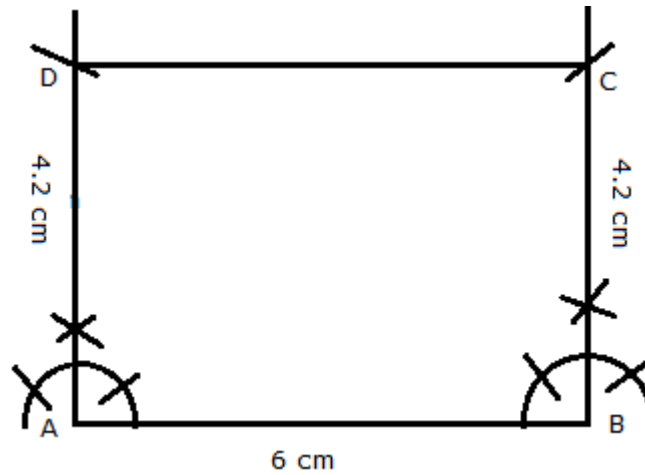
1) Draw a line segment $AB = 6$ cm.

2) At A and B, draw two perpendicular rays.

3) With A and B as centers and radius 4.2 cm, draw arcs to cut the perpendiculars at points C and D.

4) Join CD.

ABCD is the required rectangle.



14. Let the required number be x . Then,

$$26\% \text{ of } x = 65$$

$$\Rightarrow \frac{26}{100}x = 65$$

$$\Rightarrow x = \left(65 \times \frac{100}{26}\right)$$

$$\Rightarrow x = 250$$

Hence, the required number is 250.

Section C

15. First, we do the prime factorization of 42875.

$$\begin{array}{r|l}
 5 & 42875 \\
 \hline
 5 & 8575 \\
 \hline
 5 & 1715 \\
 \hline
 7 & 343 \\
 \hline
 7 & 49 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

The factors of 42875 are

$$\begin{aligned}
 42875 &= 5 \times 5 \times 5 \times 7 \times 7 \times 7 = 5^3 \times 7^3 = (5 \times 7)^3 \\
 \sqrt[3]{42875} &= 5 \times 7 = 35
 \end{aligned}$$

16. A number is divisible by 6 only if it is divisible by 2 and 3.

Consider the number 3948.

Since its units place digit is 8, which is even.

So, the number 3948 is divisible by 2.

Again, sum of digits = $3 + 9 + 4 + 8 = 24$.

Now, 24 is divisible is 3.

So, the number 3948 is divisible by 3.

Thus, the number is divisible by both 2 and 3.

Hence, 3948 is divisible by 6.

17. Here, length (height) of road roller = 110 cm

$$\text{Radius of road roller} = \frac{77}{2} \text{ cm}$$

A road roller is in the shape of a cylinder, the area covered by the road roller in one round is equal to the curved surface of the road roller.

Therefore,

Area covered in 1 revolution = CSA of cylinder

$$= 2\pi rh$$

$$= 2 \times \frac{22}{7} \times \frac{77}{2} \times 110$$

$$= 26620 \text{ cm}^2$$

Now, area covered in 500 revolutions = $500 \times 26620 \text{ cm}^2 = 13310000 \text{ cm}^2 = 1331 \text{ m}^2$.

18. Let the smallest side of the triangle be x cm.

From the given information,

$$x = \frac{1}{3} (\text{biggest side} - 5)$$

$$\text{Biggest side} = 3x + 15$$

$$\text{Also, } x = \frac{1}{2} (\text{third side} - 3)$$

$$\text{Third side} = 2x + 6$$

Perimeter of triangle = Smallest side + biggest side + third side

$$\text{Perimeter} = x + (3x + 15) + (2x + 6) = 39$$

$$6x + 21 = 39$$

$$6x = 39 - 21$$

$$6x = 18$$

$$x = 3$$

Smallest side = 3 cm

Biggest side = $3x + 15 = (3 \times 3) + 15 = 24$ cm

Third side = $2x + 6 = (2 \times 3) + 6 = 12$ cm

19. Consider:

$$\begin{aligned} & 20x - [15x^3 + 5x^2 - \{8x^2 - (4 - 2x - x^3) - 5x^3\} - 2x] \\ &= 20x - [15x^3 + 5x^2 - \{8x^2 - 4 + 2x + x^3 - 5x^3\} - 2x] \\ &= 20x - [15x^3 + 5x^2 - \{8x^2 - 4 + 2x - 4x^3\} - 2x] \\ &= 20x - [15x^3 + 5x^2 - 8x^2 + 4 - 2x + 4x^3 - 2x] \\ &= 20x - [19x^3 - 3x^2 + 4 - 4x] \\ &= 20x - 19x^3 + 3x^2 - 4 + 4x \\ &= -19x^3 + 3x^2 + 24x - 4 \end{aligned}$$

20. Steps of construction:

a) Draw $AB = 4.7$ cm.

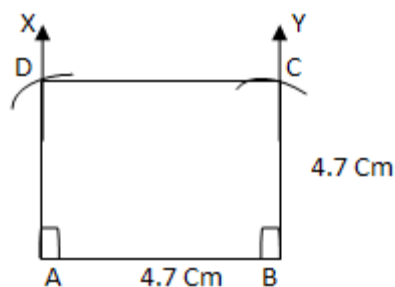
b) Draw $\angle XAB = 90^\circ$ and $\angle YBA = 90^\circ$.

c) With A as centre and radius 4.7 cm, draw an arc which cuts AX at D.

d) With B as centre and radius 4.7 cm, draw an arc which cuts BY at C.

e) Join DC.

ABCD is the required square.



21. Consider

$$\begin{aligned} 27xy^2(17x^2 - 68) &= 27xy^2 \times 17(x^2 - 4) \\ &= 17 \times 27xy^2(x^2 - 2^2) \\ &= 17 \times 27xy^2(x - 2)(x + 2) \end{aligned}$$

Thus,

$$\frac{27xy^2(17x^2 - 68)}{51 \times (x + 2)} = \frac{17 \times 27xy^2(x - 2)(x + 2)}{51 \times (x + 2)} = 9y^2(x - 2)$$

22. For every natural number $m > 1$, $2m$, $m^2 + 1$, $m^2 - 1$ is a Pythagorean triplet .

$$\text{Let } m^2 + 1 = 10 \Rightarrow m^2 = 9 \Rightarrow m = 3$$

$$\text{Therefore, } 2m = 6, m^2 - 1 = 8$$

Thus, triplet is 6, 8, 10. But 10 is not the smallest member of this.

Thus, the triplet is 6, 8, 10. But, 10 is not the smallest member of this.

$$\text{So, let us try } 2m = 10 \Rightarrow m = 5$$

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$$\Rightarrow m = 5$$

$$\text{Therefore, } m^2 + 1 = 25 + 1 = 26$$

$$m^2 - 1 = 25 - 1 = 24$$

Thus, the required Pythagorean triplet is (10, 24, 26).

23. Here, the length of sheet is 55 cm.

If the sheet is rolled along its length, then the length of the sheet becomes the circumference of base of cylinder.

Also, breadth of sheet becomes the height of cylinder.

Therefore, $2\pi r = 55$

$$\Rightarrow 2 \times \frac{22}{7} \times r = 55$$

$$\Rightarrow r = \frac{55 \times 7}{2 \times 22} = \frac{35}{4} \text{ cm}$$

Therefore,

$$\text{CSA of cylinder} = 2\pi rh = 2 \times \frac{22}{7} \times \frac{35}{4} \times 14 = 770 \text{ cm}^2$$

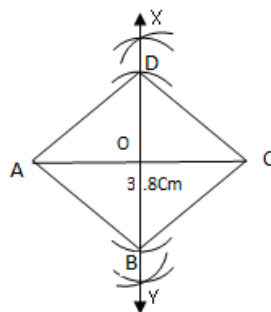
Hence, the CSA of cylinder is 770 cm^2 .

24. Diagonals of a square are perpendicular bisectors of each other. Also, they are equal.

Steps of Construction:

- Draw $AC = 3.8 \text{ cm}$.
- Draw a perpendicular bisector XY of AC meeting AC at O .
- From O , draw an arc of radius 1.9 cm on both side of AC intersecting OX at D and OY at B .
- Join AD , DC , CB and BA .

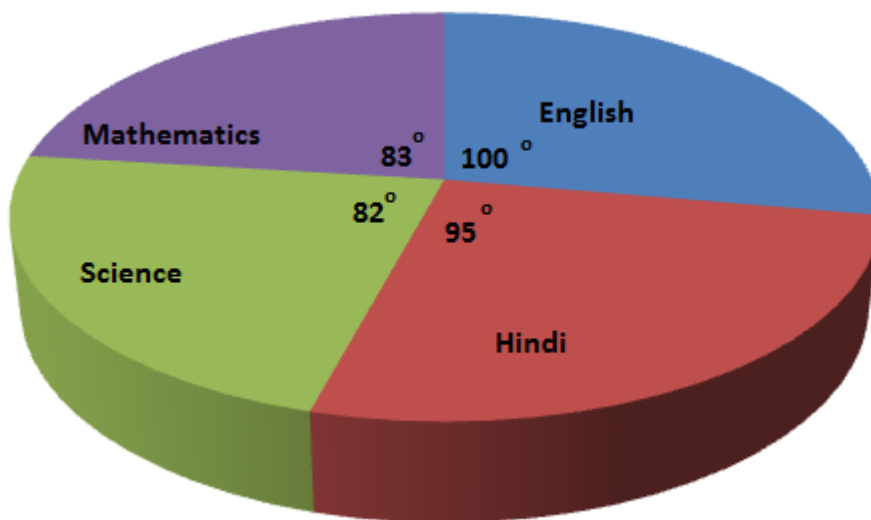
$ABCD$ is the required square.



Section D

25.

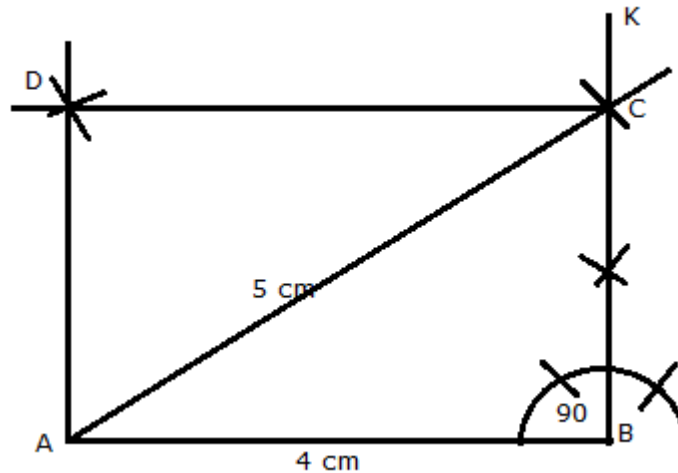
| Subjects | Marks | Measure of the central angle |
|--------------|------------|--|
| English | 100 | $\frac{100}{360} \times 360^\circ = 100^\circ$ |
| Hindi | 95 | $\frac{95}{360} \times 360^\circ = 95^\circ$ |
| Science | 82 | $\frac{82}{360} \times 360^\circ = 82^\circ$ |
| Mathematics | 83 | $\frac{83}{360} \times 360^\circ = 83^\circ$ |
| Total | 360 | 360° |



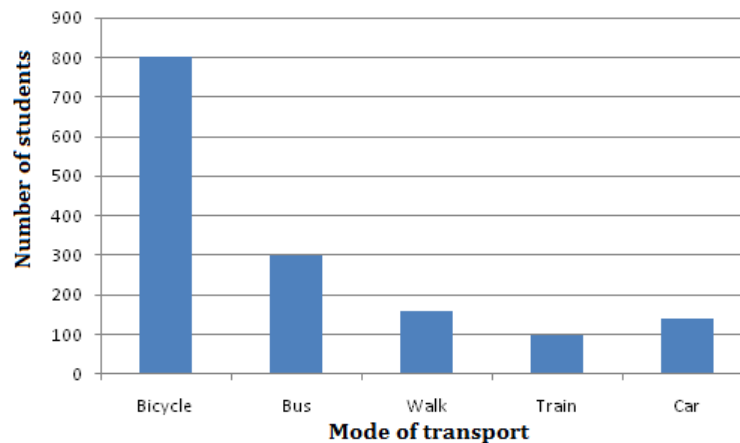
26. To construct the rectangle we go through the following steps:

- i) Draw $AB = 4$ cm.
- ii) At B, draw $\angle ABK = 90^\circ$.
- iii) With A as centre and radius 5 cm, draw an arc cutting BK at C.
- iv) With C as centre and radius 4 cm, draw an arc.
- v) With A as centre and radius = BC, draw an arc cutting the arc drawn in Step 4 at D.
- vi) Join DC and AD.

ABCD is the required rectangle.



27.



28. Let the measures of two adjacent angles, $\angle A$ and $\angle B$, of parallelogram ABCD are in the ratio of 3:2.

$$\text{Let } \angle A = 3x \text{ and } \angle B = 2x$$

We know that the sum of the measures of adjacent angles is 180° for a parallelogram.

$$\angle A + \angle B = 180^\circ$$

$$3x + 2x = 180^\circ$$

$$5x = 180^\circ$$

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

$$x = 36^\circ$$

$$\angle A = \angle C = 3x = 108^\circ \text{ (Opposite angles)}$$

$$\angle B = \angle D = 2x = 72^\circ \text{ (Opposite angles)}$$

Thus, the measures of the angles of the parallelogram are 108° , 72° , 108° and 72° , respectively.

29. The percent of discount can be defined as,

$$\text{Percent of discount } n = \frac{\text{Discount}}{\text{Original Selling Price}} \quad \dots(1)$$

For shop A, the original selling price is Rs. 32.25 and the percent of discount is 20%.

So, substitute 0.20 for the percent of discount and 32.25 for the original selling price in equation (1).

$$0.20 = \frac{\text{Discount}}{32.25}$$

$$\text{Discount} = 6.45$$

So, the discount is Rs. 6.45.

To find the sale price, subtract the discount from the original selling price.

$$\text{Selling price} = 32.25 - 6.45 = 25.80$$

So, shop A is selling the item for Rs. 25.80.

For shop B, the original selling price is Rs. 43.35 and the percent of discount is 40%.

So, substitute 0.40 for the percent of discount and 43.35 for the original selling price in equation (1).

$$0.40 = \frac{\text{Discount}}{43.35}$$

$$\text{Discount} = 17.34$$

So, the discount is Rs. 17.34.

For shop B the sale price is,

$$43.35 - 17.34 = 26.01$$

So, shop B is selling the item for Rs. 26.01.

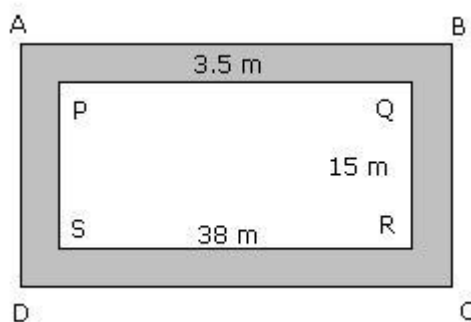
Shop A is selling the item for Rs. 25.80 and shop B for Rs. 26.01.

The difference in the sale prices is,

$$26.01 - 25.80 = 0.21$$

So, shop A's sale price is Rs. 0.21 lower than that for shop B.

30. The above data can be shown in a figure as follows:



Let PQRS represent the rectangular park and the shaded region represent the path 3.5 m wide.

Thus, to find the length AB and breadth BC, we have to add 3.5 m to both sides of rectangular park whose dimensions are $38 \times 15 \text{ m}^2$.

So, the length and breadth of the path are:

$$\text{Length AB} = (38 + 3.5 + 3.5) \text{ m} = 45 \text{ m}$$

$$\text{Breadth BC} = (15 + 3.5 + 3.5) \text{ m} = 22 \text{ m}$$

$$\text{So, perimeter of the path} = 2 \times (l + b)$$

$$= 2 \times (45 + 22)$$

$$= 2 \times 67 = 134 \text{ m}$$

Thus, perimeter of the path is 134 m.

31. From the figure we have

$$\text{Height } (h_1) \text{ of larger cylinder} = 220 \text{ cm}$$

$$\text{Radius } (r_1) \text{ of larger cylinder} = \frac{24}{2} = 12 \text{ cm}$$

$$\text{Height } (h_2) \text{ of smaller cylinder} = 60 \text{ cm}$$

$$\text{Radius } (r_2) \text{ of smaller cylinder} = 8 \text{ cm}$$

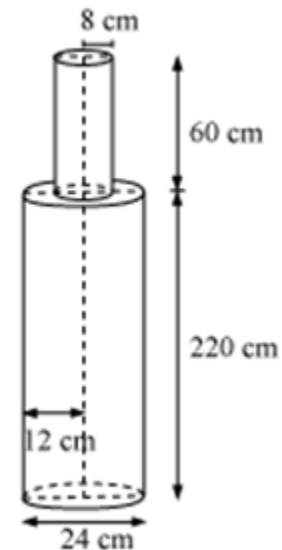
Total volume of pole = Volume of larger cylinder +
Volume of cylinder

$$\begin{aligned} \text{Total volume of pole} &= \pi r_1^2 h_1 + \pi r_2^2 h_2 \\ &= \pi (12)^2 \times 220 + \pi (8)^2 \times 60 \\ &= \pi [144 \times 220 + 6460] \\ &= 35520 \times 3.14 \\ &= 1,11,532.8 \text{ cm}^3 \end{aligned}$$

$$\text{Mass of } 1 \text{ cm}^3 \text{ iron} = 8 \text{ g}$$

$$\text{Mass of } 111532.8 \text{ cm}^3 \text{ iron} = 111532.8 \times 8$$

$$= 892262.4 \text{ g} = 892.262 \text{ kg}$$



32. (i) 548

$$548 = 500 + 40 + 8$$

$$= 5 \times 100 + 4 \times 10 + 8 \times 1$$

(ii) 6985

$$6985 = 6000 + 900 + 80 + 5$$

$$6985 = 6 \times 1000 + 9 \times 100 + 8 \times 10 + 5 \times 1$$

(iii) 85

$$85 = 80 + 5$$

$$85 = 8 \times 10 + 5 \times 1$$

(iv) 356

$$365 = 300 + 60 + 5$$

$$365 = 3 \times 100 + 6 \times 10 + 5 \times 1$$

33. I) $(-8)^2 = (-8) \times (-8) = 64$

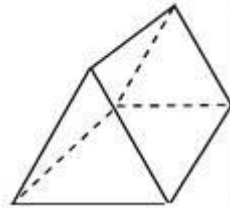
II) $(-7)^2 = (-7) \times (-7) = 49$

III) $(15)^3 = 15 \times 15 \times 15 = 3375$

IV) $-(12^2) = -(12 \times 12) = -144$

34. I) Prism: A prism is a solid whose bases are identical polygon faces and the other faces are rectangles. A triangular prism has triangle at the ends.

Diagram:



Verification of Euler's formula:

Here, $F = 5$, $V = 6$ and $E = 9$

Thus, $F + V - E = 5 + 6 - 9 = 11 - 9 = 2$

$F + V - E = 2$

Hence, Euler's formula is verified.

- II) Cylinder: Cylinder is a solid shape in which top and bottom are circular, while the remaining surface is curved.

Diagram:



Number of faces = 3

Number of edges = 2