

Maharashtra Board

Class VII Mathematics

Board Paper – 1

Solution

Q1.

1. $y - 2 = 9$

$$\therefore y - 2 + 2 = 9 + 2$$

$$\therefore y = 11$$

Thus, the solution of the equation $y - 2 = 9$ is 11.

2. $7^{19} \div 7^4 = \frac{7^{19}}{7^4} = 7^{19-4} = 7^{15}$

3. $\frac{5}{9} + \frac{8}{9} = \frac{5+8}{9} = \frac{13}{9}$

4. $2\frac{1}{4} = \frac{9}{4}$

$$\sqrt{\frac{9}{4}} = \sqrt{\frac{3 \times 3}{2 \times 2}} = \frac{3}{2}$$

5. $4 \times (x + 2) = 4x + 4 \times 2 = 4x + 8$

6. Given, Cost Price (C.P.) = Rs. 70, Selling Price (S.P.) = Rs. 90
Profit = Selling Price - Cost Price = $90 - 70 = 20$

7. Given, Side = 48.2 cm
Thus, area of a square = $(\text{Side})^2 = (48.2)^2 = 2323.24$ sq. cm

8. Given, $\angle XZP = 100^\circ$.
Angles in the same segments are congruent.
 $\therefore m\angle XZP = 100^\circ$

9. Given, side = $l = 5.5$ cm
Total surface area of a cube = $6l^2 = 6 \times 5.5 \times 5.5 = 181.5$ sq. cm

10. Given, length = 7 cm and breadth = 9 cm
Now, area of a rectangle = length \times breadth = 7 cm \times 9 cm = 63 sq. cm

11. Given, Principal = Rs. 1260 and Interest = Rs. 126
Amount = Principal + Interest = 1260 + 126 = Rs. 1386

12. $(-5.13)^2 = (-5.13) \times (-5.13) = 26.3169$

Q2.

1. Area of the floor = (side)² = (6.5)² = 42.25 sq. m
Perimeter of the floor = 4(side) = 4(6.5) = 26 m

2. $4(y^2 - 2y + 7)$
 $= (4 \times y^2) - (4 \times 2y) + (4 \times 7)$
 $= 4y^2 - 8y + 28$

3. The sum of the measure of the angles of a quadrilateral is 360°.
Given, the measure of one angle is 100°.
∴ The sum of the measure of the remaining angles of the quadrilateral
 $= 360^\circ - 100^\circ = 260^\circ$

4. Number of days = 5
Total income of the vegetable vendor = 73 + 79 + 81 + 77 + 75 = Rs. 385
∴ Average daily income = $\frac{385}{5} = \text{Rs. } 77$

5. Diameter of an atom of gold = 0.000000000003 cm
 $0.000000000003 = \frac{3}{1000000000000} = \frac{3}{10^{12}} = 3 \times 10^{-12} \text{ cm}$

6. Given, One side = 18 and Other side = 24
By Pythagoras theorem,
(Hypotenuse)² = (One side)² + (Other side)²
 $\Rightarrow (\text{Hypotenuse})^2 = (18)^2 + (24)^2$
 $\Rightarrow (\text{Hypotenuse})^2 = 324 + 576$
 $\Rightarrow (\text{Hypotenuse})^2 = 900$
 $\Rightarrow (\text{Hypotenuse}) = 30$

7. Let x be the length of a side of an equilateral triangle.
The perimeter of an equilateral triangle = 3 × side
According to the given condition, 3 × x = 57
But, 3 × 19 = 57
∴ x = 19
∴ The length of the side of the equilateral triangle is 19 cm.

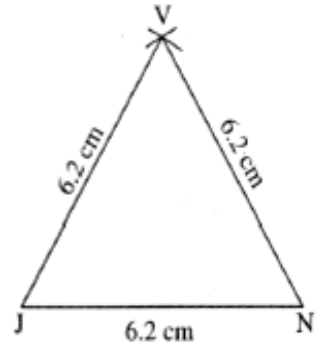
8. Given, $l = 7.5$ m, $b = 2.4$ m and $h = 3$ m
 Volume of the tank = $l \times b \times h = 7.5 \times 2.4 \times 3 = 54$ cu. m

Q3.

1. Steps of construction:

- (a) Draw seg JN of length 6.2 cm.
 (b) Taking J as centre and radius as 6.2 cm, draw an arc on one side of seg JN.
 (c) Taking N as centre and radius as 6.2 cm, draw another arc intersecting the first arc at point 'V'.
 (d) Join seg VJ and seg VN.

Thus, ΔVJN is the required triangle.



2. The sides of the triangle forming the right angle are 15 m and 8 m respectively.

The diagonal of the rectangle is the hypotenuse of the right angled triangle.

$$\text{Thus, } (\text{Diagonal})^2 = (\text{Hypotenuse})^2 = (\text{One side})^2 + (\text{Other side})^2$$

$$\Rightarrow (\text{Diagonal})^2 = (15)^2 + (8)^2 = 225 + 64 = 289$$

$$\therefore (\text{Diagonal})^2 = (17)^2$$

$$\therefore \text{Diagonal} = 17 \text{ m}$$

Thus, the length of the diagonal of the rectangular piece of land is 17 m.

3. The length of the longest side = side KM = 15 cm

$$\Rightarrow (15)^2 = 225 \quad \dots\text{(i)}$$

The length of the other two sides are $l(KL) = 9$ cm and $l(LM) = 12$ cm

$$\text{The sum of their squares} = (9)^2 + (12)^2 = 81 + 144 = 225 \quad \dots\text{(ii)}$$

$$\therefore [l(KM)]^2 = [l(KL)]^2 + [l(LM)]^2 \quad \dots[\text{From (i) and (ii)}]$$

We observe that the square of side KM is equal to the sum of the squares of the other two sides KL and LM.

$\therefore \Delta KLM$ is a right-angled triangle and side KM is the hypotenuse. The angle opposite to the hypotenuse is a right angle.

$\therefore \angle L$ is the right angle.

ΔKLM is a right angled triangle and $m\angle L = 90^\circ$

4. Length of the floor = 6.6 m = 660 cm and Breath of the floor = 4.5 m = 450 cm

$$\text{Area of the floor} = l \times b = 660 \times 450 \text{ sq. cm}$$

$$\text{Area of the square tile} = (\text{side})^2 = 30 \times 30 \text{ sq.cm}$$

$$\text{Now, number of tiles required} = \frac{\text{Area of the floor}}{\text{Area of the square tile}} = \frac{660 \times 450}{30 \times 30} = 300$$

Thus, 300 tiles are required.

5. Loss = 12%

On C.P. of Rs. 100, the loss is Rs. 12.

S.P. = C.P. - Loss = 100 - 12 = Rs. 88

C.P. of the washing machine = 10000

Let the selling price (S.P.) of the machine be x.

Ratio of the selling price = Ratio of the Cost price

$$\Rightarrow \frac{x}{88} = \frac{10000}{100}$$

$$\Rightarrow \frac{x}{88} = 100$$

$$\Rightarrow x = 100 \times 88 \Rightarrow x = 8800$$

Thus, the selling price of a washing machine is Rs. 8800.

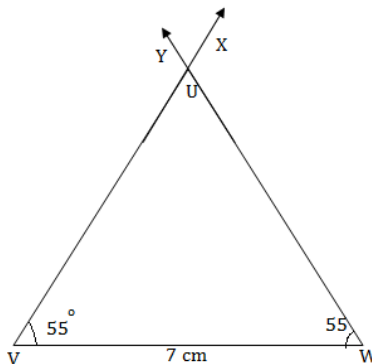
6. Steps of construction:

(a) Draw seg VW = 7 cm.

(b) Draw a ray VX through point V such that $m\angle XVW = 55^\circ$ and a ray WY through point W such that $m\angle YWV = 55^\circ$.

(c) Name the point of intersection as U.

Thus, ΔUVW is the required triangle.



7. Given, length = 2.5 m, b = 2 m and h = 2.4 m

Total surface area of the tank = $2(lb + bh + hl)$

$$= 2(2.5 \times 2 + 2 \times 2.4 + 2.4 \times 2.5)$$

$$= 2(5.0 + 4.8 + 6.0)$$

$$= 2 \times 15.8$$

$$= 31.6 \text{ sq. m}$$

Metal sheet required = Total surface area of the tank = 31.6 sq. m

Cost of constructing it at Rs. 10 per sq. m = $31.6 \times 10 = \text{Rs. } 316$

Volume of the water the tank can hold = Volume of the tank

$$\text{Volume of the tank} = l \times b \times h = 2.5 \times 2 \times 2.4 = 12 \text{ cu. m}$$

Thus, the tank can hold 12 cu. m of water.

Q4.

1. If the weight of jaggery increases, its cost will also increase.

∴ This is an example of direct variation.

Given, weight of jaggery = 4 kg

Cost of 4 kg jaggery = Rs. 80

$$\therefore \frac{\text{Weight of jaggery}}{\text{cost}} = \frac{4}{80}$$

Given, weight of jaggery = 15 kg

Cost of 15 kg = Rs. x.

$$\therefore \frac{\text{Weight of jaggery}}{\text{cost}} = \frac{15}{x}$$

In direct variation, the ratio of the weight of jaggery to the cost remains constant.

$$\therefore \frac{4}{80} = \frac{15}{x} \Rightarrow 4 \times x = 15 \times 80$$

$$\therefore x = \frac{15 \times 80}{4} = 300$$

Thus, the cost of 15 kg jaggery is Rs. 300.

2. Let John get x litres of milk, then Saurabh gets (x + 2) litres of milk.

Total quantity of milk given to them = [x + (x + 2)] litres.

According to the given condition, x + (x + 2) = 10

$$\Rightarrow 2x + 2 = 10$$

$$\Rightarrow 2x = 10 - 2 = 8 \Rightarrow x = 4$$

And, x + 2 = 4 + 2 = 6

Thus, John got 4 litres of milk and Saurabh got 6 litres of milk.

3.

i. $\angle ABC, \angle BCD, \angle CDA, \angle DAB$

ii. The point 'Q' is in the exterior of the quadrilateral.

iii. Side CD and side AB are the sides adjacent to side AD.

iv. Point 'P' is in the interior of the quadrilateral.

4.

i. Part I is a rectangle, whose length = 4.5 - 1.0 = 3.5 cm and breadth = 1 cm

Thus, area of part I = length × breadth = 3.5 × 1 = 3.5 sq. cm

ii. Part II is a square, whose side is 1 cm.

Thus, area of Part II = (Side)² = (1)² = 1 sq. cm

iii. Part III is a rectangle, whose length = 6.5 cm and breadth = 1 cm

Thus, area of part III = length × breadth = 6.5 × 1 = 6.5 sq. cm

iv. Part IV is a rectangle, whose length = 6.5 cm and breadth = 4.5 - 1.0 = 3.5 cm

Thus, area of part IV = length × breadth = 6.5 × 3.5 = 22.57 sq. cm

5.

- i. Diagonals of a square are congruent.
 $l(QS) = l(PR) = 6 \text{ cm}$
- ii. Diagonal of a square bisect each other.
 \therefore Point O is the midpoint of segment PR and segment QS.
 $\Rightarrow l(QO) = \frac{1}{2}l(QS) = \frac{1}{2} \times 6 = 3 \text{ cm}$
- iii. Diagonal of a square bisect each other.
 \therefore Point O is the midpoint of segment PR and segment QS
 $\Rightarrow l(PO) = \frac{1}{2}l(PR) = \frac{1}{2} \times 6 = 3 \text{ cm}$
- iv. Diagonals of a square are perpendicular bisectors of each other.
 $\Rightarrow m\angle POS = 90^\circ$

Q5.

1. From the given graph:

- i. The number of literate women is the highest in village C.
- ii. In village B, the number of literate and illiterate women is same.
- iii. There are 400 illiterate women in village C.
- iv. In village D,
Number of literate women = 500
Number of illiterate women = 700
Now, $700 - 500 = 200$
Thus, in village D, number of illiterate women exceeds the number of literate women by 200.
- v. In village D, the number of literate women is least.

2. From the given figure,

- i. Vertices – P, Q, R, S, T, U, V and W
- ii. Edges – seg PQ, seg OR, seg RS, seg SP, seg TU, seg UV, seg VW, seg WT, seg PW, seg QT, seg RU and seg SV
- iii. Faces – PQRS, TUVW, PQTW, QRUT, RSVU and SPWV
- iv. Vertex R is common to seg RS, seg RQ and seg RU.
- v. Vertex W is common to seg WP, seg WT and seg WV.