# Maharashtra Board <br> Class VII Mathematics <br> Board Paper - 2 <br> Solution 

Q1.

1. $y-2=9$
$\therefore y-2+2=9+2$
$\therefore \mathrm{y}=11$
Thus, the solution of the equation $\mathrm{y}-2=9$ 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. $4 \times(x+2)=4 x+4 \times 2=4 x+8$
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 $=48.2 \mathrm{~cm}$

Thus, area of a square $=(\text { Side })^{2}=(48.2)^{2}=2323.24$ sq. cm
8. Given, $\angle \mathrm{XZP}=100^{\circ}$.

Angles in the same segments are congruent.
$\therefore \mathrm{m} \angle \mathrm{XZP}=100^{\circ}$
9. Given, side $=l=5.5 \mathrm{~cm}$

Total surface area of a cube $=61^{2}=6 \times 5.5 \times 5.5=181.5$ sq. cm
10. Given, length $=7 \mathrm{~cm}$ and breadth $=9 \mathrm{~cm}$

Now, area of a rectangle $=$ length $\times$ breadth $=7 \mathrm{~cm} \times 9 \mathrm{~cm}=63 \mathrm{sq} . \mathrm{cm}$
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 $=(\text { side })^{2}=(6.5)^{2}=42.25$ sq. m

Perimeter of the floor $=4($ side $)=4(6.5)=26 \mathrm{~m}$
2. $4\left(y^{2}-2 y+7\right)$
$=\left(4 \times y^{2}\right)-(4 \times 2 y)+(4 \times 7)$
$=4 y^{2}-8 y+28$
3. The sum of the measure of the angles of a quadrilateral is $360^{\circ}$.

Given, the measure of one angle is $100^{\circ}$.
$\therefore$ 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
$\therefore$ Average daily income $=\frac{385}{5}=$ Rs. 77
5. Diameter of an atom of gold $=0.000000000003 \mathrm{~cm}$

$$
0.000000000003=\frac{3}{1000000000000}=\frac{3}{10^{12}}=3 \times 10^{-12} \mathrm{~cm}
$$

6. Given, One side $=18$ and Other side $=24$

By Pythagoras theorem,
$(\text { Hypotenuse })^{2}=(\text { One side })^{2}+(\text { Other side })^{2}$
$\Rightarrow(\text { Hypotenuse })^{2}=(18)^{2}+(24)^{2}$
$\Rightarrow(\text { Hypotenuse })^{2}=324+576$
$\Rightarrow(\text { Hypotenuse })^{2}=900$
$\Rightarrow($ Hypotenuse $)=30$
7. Let $x$ be the length of a side of an equilateral triangle.

The perimeter of an equilateral triangle $=3 \times$ side
According to the given condition, $3 \times x=57$
But, $3 \times 19=57$
$\therefore \mathrm{x}=19$
$\therefore$ The length of the side of the equilateral triangle is 19 cm .
8. Given, $\mathrm{l}=7.5 \mathrm{~m}, \mathrm{~b}=2.4 \mathrm{~m}$ and $\mathrm{h}=3 \mathrm{~m}$

Volume of the tank $=\mathrm{l} \times \mathrm{b} \times \mathrm{h}=7.5 \times 2.4 \times 3=54 \mathrm{cu} . \mathrm{m}$
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) Jon seg VJ and seg VN.

Thus, $\Delta \mathrm{VJN}$ 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.
Thus, $(\text { Diagonal })^{2}=(\text { Hypotenuse })^{2}=(\text { One side })^{2}+(\text { Other side })^{2}$
$\Rightarrow(\text { Diagonal })^{2}=(15)^{2}+(8)^{2}=225+64=289$
$\therefore(\text { Diagonal })^{2}=(17)^{2}$
$\therefore$ Diagonal $=17 \mathrm{~m}$
Thus, the length of the diagonal of the rectangular piece of land is 17 m .
3. The length of the longest side $=$ side $K M=15 \mathrm{~cm}$
$\Rightarrow(15)^{2}=225$
The length of the other two sides are $l(\mathrm{KL})=9 \mathrm{~cm}$ and $l(\mathrm{LM})=12 \mathrm{~cm}$
The sum of their squares $=(9)^{2}+(12)^{2}=81+144=225$
$\therefore[l(\mathrm{KM})]^{2}=[l(\mathrm{KL})]^{2}+[l(\mathrm{LM})]^{2}$
....[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.
$\therefore \Delta \mathrm{KLM}$ is a right-angled triangle and side KM is the hypotenuse. The angle opposite to the hypotenuse is a right angle.
$\therefore \angle \mathrm{L}$ is the right angle.
$\Delta \mathrm{KLM}$ is a right angled triangle and $\mathrm{m} \angle \mathrm{L}=90^{\circ}$
4. Length of the floor $=6.6 \mathrm{~m}=660 \mathrm{~cm}$ and Breath of the floor $=4.5 \mathrm{~m}=450 \mathrm{~cm}$

Area of the floor $=1 \times b=600 \times 450$ sq. cm
Area of the square tile $=(\text { side })^{2}=30 \times 30$ sq.cm
Now, number of tiles required $=\frac{\text { Area of the floor }}{\text { Area of the square tile }}=\frac{600 \times 450}{30 \times 30}=300$
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
$\Rightarrow \frac{\mathrm{x}}{88}=\frac{10000}{100}$
$\Rightarrow \frac{\mathrm{x}}{88}=100$
$\Rightarrow \mathrm{x}=100 \times 88 \Rightarrow \mathrm{x}=8800$
Thus, the selling price of a washing machine is Rs. 8800 .
6. Steps of construction:
(a) Draw seg VW $=7 \mathrm{~cm}$.
(b) Draw a ray VX through point $V$ such that $\mathrm{m} \angle \mathrm{XVW}=55^{\circ}$ and a ray WY through point W such that $\mathrm{m} \angle \mathrm{YWV}=55^{\circ}$.
(c) Name the point of intersection as $U$.

Thus, $\triangle$ UVW is the required triangle.

7. Given, length $=2.5 \mathrm{~m}, \mathrm{~b}=2 \mathrm{~m}$ and $\mathrm{h}=2.4 \mathrm{~m}$

Total surface area of the tank $=2(\mathrm{lb}+\mathrm{bh}+\mathrm{hl})$
$=2(2.5 \times 2+2 \times 2.4+2.4 \times 2.5)$
$=2(5.0+4.8+6.0)$
$=2 \times 15.8$
$=31.6 \mathrm{sq} . \mathrm{m}$
Metal sheet required $=$ Total surface area of the tank $=31.6$ sq. m
Cost of constructing it at Rs. 10 per sq. $\mathrm{m}=31.6 \times 10=$ Rs. 316
Volume of the water the tank can hold $=$ Volume of the tank
Volume of the tank $=\mathrm{l} \times \mathrm{b} \times \mathrm{h}=2.5 \times 2 \times 2.4=12 \mathrm{cu} . \mathrm{m}$
Thus, the tank can hold 12 cu . m of water.

Q4.

1. If the weight of jaggery increases, its cost will also increase.
$\therefore$ This is an example of direct variation.
Given, weight of jaggery $=4 \mathrm{~kg}$
Cost of 4 kg jiggery $=$ Rs. 80
$\therefore \frac{\text { Weight of jaggery }}{\operatorname{cost}}=\frac{4}{80}$
Given, weight of jaggery $=15 \mathrm{~kg}$
Cost of $15 \mathrm{~kg}=$ Rs. x .
$\therefore \frac{\text { Weight of jaggery }}{\cos t}=\frac{15}{\mathrm{x}}$
In direct variation, the ratio of the weight of jaggery to the cost remains constant.
$\therefore \frac{4}{80}=\frac{15}{\mathrm{x}} \Rightarrow 4 \times \mathrm{x}=15 \times 80$
$\therefore \mathrm{x}=\frac{15 \times 80}{4}=300$
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, $x+(x+2)=10$
$\Rightarrow 2 \mathrm{x}+2=10$
$\Rightarrow 2 \mathrm{x}=10-2=8 \Rightarrow \mathrm{x}=4$
And, $x+2=4+2=6$
Thus, John got 4 litres of milk and Saurabh got 6 litres of milk.

## 3.

i. $\angle \mathrm{ABC}, \angle \mathrm{BCD}, \angle \mathrm{CDA}, \angle \mathrm{DAB}$
ii. The point ' $Q$ ' is in the exterior of the quadrilateral.
iii. Side $C D$ and side $A B$ are the sides adjacent to side $A D$.
iv. Point ' P ' is in the interior of the quadrilateral.
4.
i. Part I is a rectangle, whose length $=4.5-1.0=3.5 \mathrm{~cm}$ and breadth $=1 \mathrm{~cm}$ Thus, area of part $\mathrm{I}=$ length $\times$ breadth $=3.5 \times 1=3.5$ sq. cm
ii. Part II is a square, whose side is 1 cm .

Thus, area of Part II $=(\text { Side })^{2}=(1)^{2}=1$ sq. cm
iii. Part III is a rectangle, whose length $=6.5 \mathrm{~cm}$ and breadth $=1 \mathrm{~cm}$ Thus, area of part III $=$ length $\times$ breadth $=6.5 \times 1=6.5 \mathrm{sq} . \mathrm{cm}$
iv. Part IV is a rectangle, whose length $=6.5 \mathrm{~cm}$ and breadth $=4.5-1.0=3.5 \mathrm{~cm}$ Thus, area of part IV $=$ length $\times$ breadth $=6.5 \times 3.5=22.57 \mathrm{sq} . \mathrm{cm}$
5.
i. Diagonals of a square are congruent. $l(\mathrm{QS})=l(\mathrm{PR})=6 \mathrm{~cm}$
ii. Diagonal of a square bisect each other.
$\therefore$ Point O is the midpoint of segment PR and segment QS .
$\Rightarrow \mathrm{l}(\mathrm{QO})=\frac{1}{2} \mathrm{l}(\mathrm{QS})=\frac{1}{2} \times 6=3 \mathrm{~cm}$
iii. Diagonal of a square bisect each other.
$\therefore$ Point O is the midpoint of segment PR and segment QS
$\Rightarrow l(P O)=\frac{1}{2} l(P R)=\frac{1}{2} \times 6=3 \mathrm{~cm}$
iv. Diagonals of a square are perpendicular bisectors of each other.
$\Rightarrow \mathrm{m} \angle \mathrm{POS}=90^{\circ}$

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.

