Maharashtra State Board
Class VI Mathematics
Board Paper 2
Solution

Time: 2 hr 30 min **Total Marks: 60**

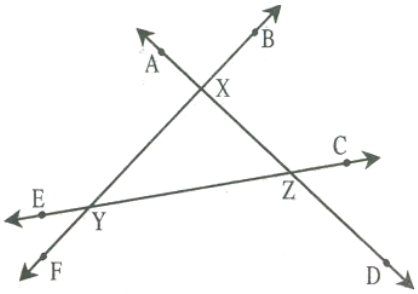
Q1.

1. Numbers to the left of zero are:
   −9, −28, −100, −4, −1, −48, −95.
   Numbers to the right of zero are:
   +5, +81, +1, +72, +65.

2. 6 = k − 2
   ∴ 6 + 2 = k − 2 + 2 …[Addition property of equality]
   ∴ 8 = k + 0 …[∵ (−2) + 2 = 0 and 6 + 2 = 8]
   ∴ 8 = k …(∵ Any number + 0 = the same number)
   Hence, the value of k is 8.

3. A triangle has 6 exterior angles in all.

   Exterior angles of the triangle are:
   ∠AXY, ∠BXZ, ∠CZX, ∠DZY, ∠FYZ, and ∠EYX



4. $\frac{7}{20} = \frac{7 \times 5}{20 \times 5} = \frac{35}{100} = 35\%$

5. Diameter of the circle = 5.6 cm
   ∴ Radius of the circle = (5.6 ÷ 2) cm = 2.8 cm

6. Magnitude of the two numbers = 7 and 9
   Bigger magnitude = 9
   Difference between the magnitudes = 9 − 7 = 2

7. If the lengths of two sides of a triangle are equal, then such a triangle is called an isosceles triangle.
   PQ = 7 cm and QR = 6 cm
   Thus, ΔPQR will be an isosceles triangle if PR = 6 cm or PR = 7 cm.

8. 15x and 7y are unlike terms. Hence, when adding 15x and 7y we cannot add their coefficients.
   ∴ Sum of 15x and 7y is written as '15x + 7y'.

9. Length of a rectangle = 12 cm
   Breadth of a rectangle = 10 cm
   $\therefore$ Area of a rectangle = Length $\times$ Breadth = $12 \times 10 = 120$ sq. cm

10. Side of a cube, l = 10 cm
    Now, volume of the cube = l^3
    $= 10^3$
    $= 10 \times 10 \times 10$
    $= 1000$ cu. cm

11. $-16 - (-9) = -16 + 9$
    $= 7$

12. Algebraic term: $-5b^3$
    Coefficient: -5
    Variable: b

Q2.

1. Length of the wall = l = 5 m
   Height of the wall = b = 3 m
   Area of the wall = l $\times$ b
   $= 5 \times 3$
   $= 15$ sq. m
   Cost of painting 1 sq. m = Rs. 15
   $\therefore$ Cost of painting 15 sq. m = 15×15 = Rs. 225
   Thus, the cost of painting the wall would be Rs. 225.

2. 5% of 60
   $= \frac{5}{100} \times 60$
   $= \frac{1}{20} \times 60$
   $= 3$
   Hence, 5% of 60 is 3.

3. Given: a = 3, b = 4 and c = –2
   $\therefore b^2 + a^2 - c^2 = (4)^2 + (3)^2 - (-2)^2$
   $= 16 + 9 - 4$
   $= 21$

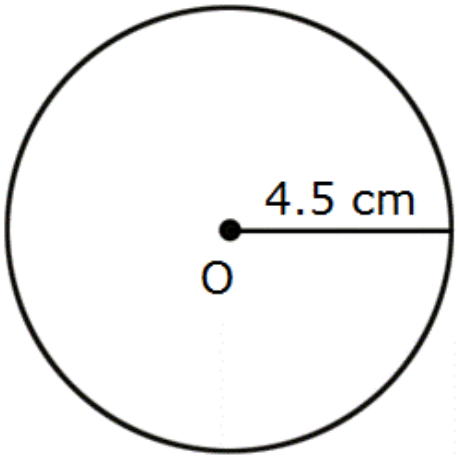
4. A triangle with one obtuse angle is called an obtuse-angled triangle.
   In ΔABC, $m\angle ABC = 110°$ and hence $\angle ABC$ is an obtuse angle.
   Therefore, ΔABC is an obtuse-angled triangle.

5. $(-5) \times [-13 + 10]$
   $= (-5) \times (-3)$
   $= 15$

6. By the property of exterior angle of a triangle,
   $m\angle BCD = m\angle BAC + m\angle ABC$
   $\therefore 130° = m\angle BAC + 60°$
   $\therefore m\angle BAC = 130° - 60°$
   $\therefore m\angle BAC = 70°$

7. Length of the water tank = l = 5 m
   Breadth of the water tank = b = 3 m
   Height of the water tank = h = 1 m
   Volume of the water tank = l × b × h
   = 5 × 3 × 1
   = 15 cu. m
   Thus, the volume of the water tank is 15 cu. m

8. Radius = 45 mm = (45 ÷ 10) cm = 4.5 cm
   Take a Point O on a paper. Using a compass, take Point O as the centre and radius 4.5 cm, draw a circle.



   Diameter = 2 × radius = 2 × 4.5 cm = 9 cm
   Thus, the diameter of the circle is 9 cm.

Q3.

1. The principal remains the same but the period increases 3 times.
   (2 years × 3 = 6 years)
   $\therefore$ The interest will also be tripled.
   $\therefore$ Interest for 6 years = Rs. (3300 × 3) = Rs. 9,900.

2. We know that the diameter of a circle = 2 × (radius)
   By applying the formula, we get
   (i) Radius = 12.9 cm
   Diameter = 2 × 12.9 cm = 25.8 cm
   Hence, the diameter of the circle is 25.8 cm.

   (ii) Radius = 0.6 m
   Diameter = 2 × 0.6 m = 1.2 m
   Hence, the diameter of the circle is 1.2 m.

   (iii) Radius = 8.5 cm
   Diameter = 2 × 8.5 = 17 cm
   Hence, the diameter of the circle is 17 cm.

3. Area of Shamita's room = length × breadth
   = 25 m × 22 m
   = 550 m^2

$$\begin{array}{rrrr} & & 2 & 5 \\ \times & & 2 & 2 \\ \hline & & 5 & 0 \\ + & 5 & 0 & 0 \\ \hline & 5 & 5 & 0 \end{array}$$

   So, the area of Shamita's room is 550 m^2.

   Area of square tile = Side × Side
   = 1 m × 1 m
   = 1 m^2
   So, the area of one square tile is 1 m^2.

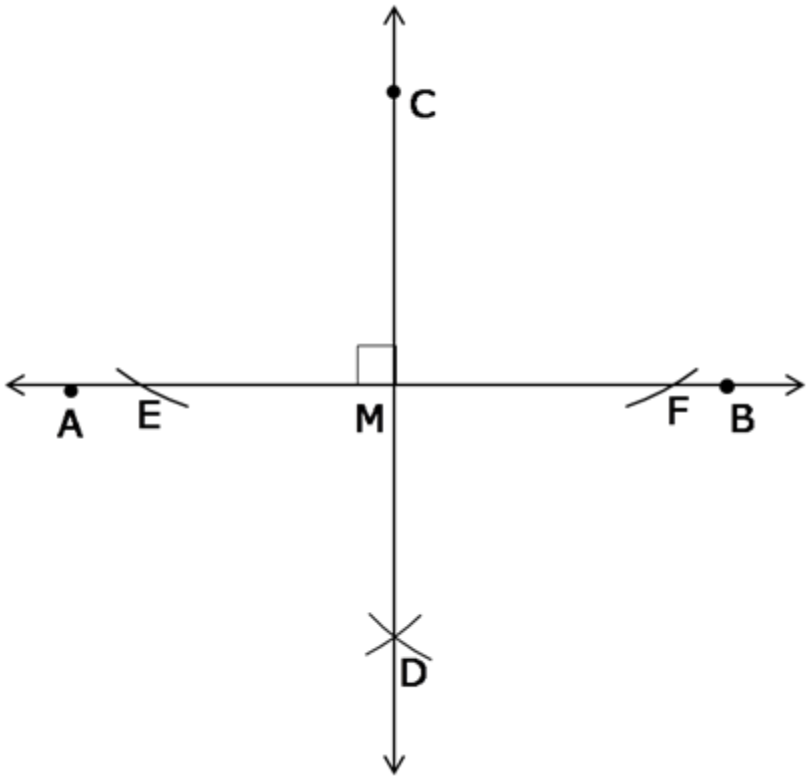
   Number of tiles needed for Shamita's room
   = Area of Shamita's room ÷ Area of one square tile
   = 550 ÷ 1
   = 550 tiles
   Hence, 550 tiles will be required for Shamita's room.

4.
   (i) ΔABC, ΔABO, ΔACO, ΔBOC
   (ii) ΔOAC, ΔOAB, ΔOBC
   (iii) ΔAOB, ΔAOC, ΔABC

5. (2p + 3q + 4c) + (4q – 5p)
   Writing the like terms together:
   (2p – 5p) + (3q + 4q) + 4c
   = −3p + 7q + 4c

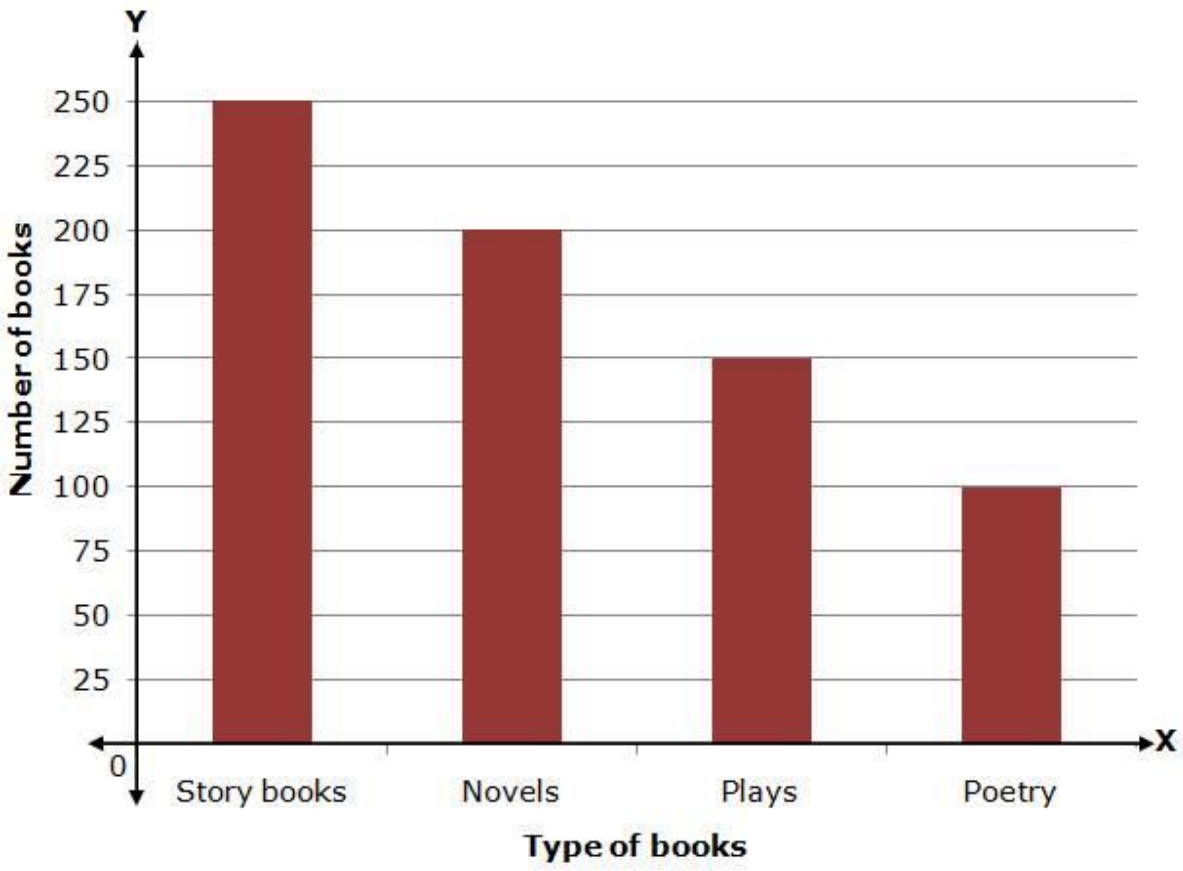
6. Let the measure of each angle be x.
   Then, $x + x + x = 180°$
   $\therefore 3x = 180°$
   $\therefore x = \frac{180°}{3}$
   $\therefore x = 60°$
   Hence, if all three angles of a triangle are equal then the measure of each angle is 60°.

7. Steps of construction:
   1. Draw a line AB.
   2. Take a point C outside the line.
   3. Adjust the compass to a convenient radius.
   4. Place the point of the compass on C and draw two arcs cutting AB at points E and F.
   5. Using the same radius and placing the point of compass on E and F draw two arcs of circle intersecting each other on the side of line AB opposite to point C.
   6. Name the point of intersection as D.
   7. Draw the line CD passing through points C and D.
      Hence, CD $\perp$ AB



Q4.

1.



2.

(i) The points which are in the exterior of the circle are Points A, C and D.
The points which are in the interior of the circle are Points B and O.
(ii) The radii of the circle are Line segments OP, OS, OT, OQ and OR.
(iii) The diameter of the circle is Line segment ST.
(iv) The chords of the circle are Line segments ST and QR.

3. Length of the wall = 10 m = 1000 cm
Height of the wall = 4 m = 400 cm
Thickness of the wall = 24 cm
Volume of the wall = $(1000 \times 400 \times 24)\ cm^3$
Volume of each brick = $(24 \times 12 \times 8)\ cm^3$

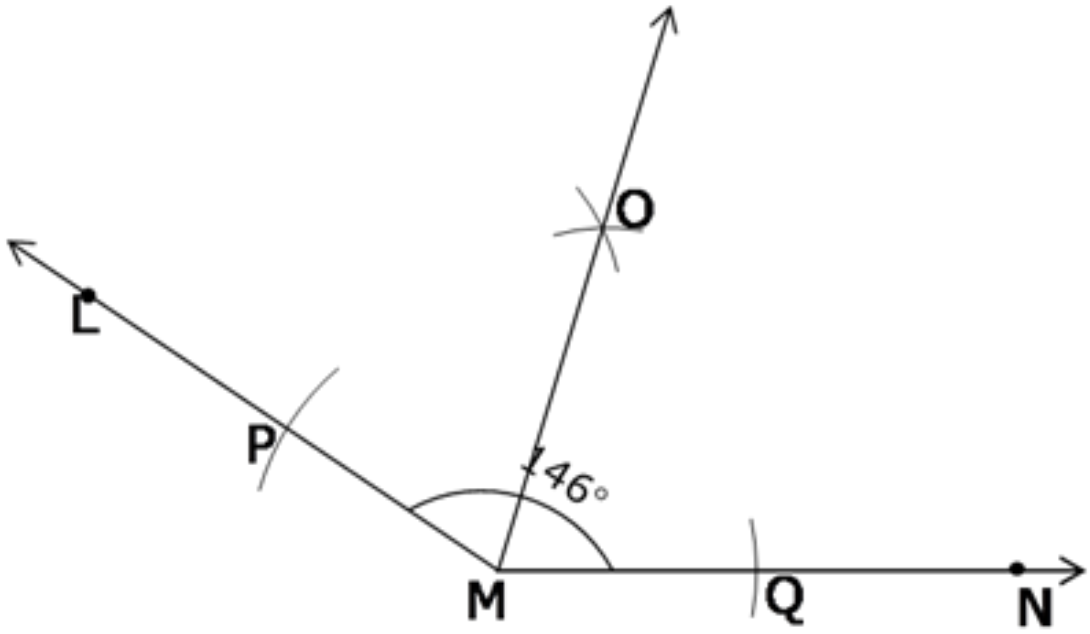
$$\text{No. of bricks required} = \frac{\text{Volume of the wall}}{\text{Volume of each brick}}$$
$$= \frac{1000 \times 400 \times 24}{24 \times 12 \times 8}$$
$$= 4166.667$$

Since, the brick is to be taken as a whole, so to build the wall 4167 bricks are required.

4. Rate of interest is 10 p.c.p.a.
   ∴ Interest on a principal of Rs. 100 for 1 year = Rs. 10
   ∴ Interest on Rs. 100 principal for 2 years = Rs. 20
   Now, Rs. 20,000 is 200 times Rs. 100.
   ∴ Interest on Rs. 20,000 for 2 years = 20 × 200 = Rs. 4000

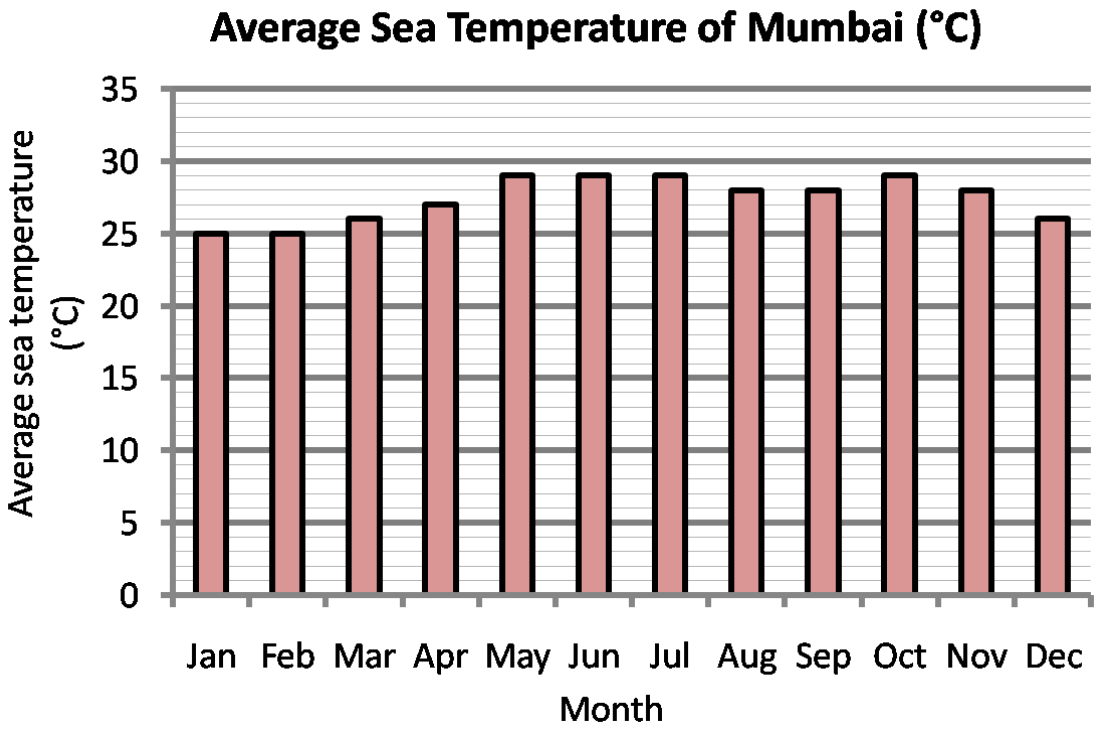
5. Steps of construction:
   1. Draw ∠LMN of measure 146°.
   2. Place the point of the compass on point M.
   3. Taking a suitable span, draw an arc intersecting ray ML and ray MN at the points P and Q respectively.
   4. Keeping the same span, draw arcs, first with centre P and then another with centre Q, to intersect the first arc. Let the point of intersection be O.
   5. Draw ray MO.

   Thus, ray MO is the bisector of ∠LMN.



Q5.

1.



2.

(i) $\frac{y}{5} = 12$

$\therefore \frac{y}{5} \times 5 = 12 \times 5$ (Multiplication property of equality)

$\therefore y \times 1 = 60$ $\left(\because \frac{5}{5} = 1 \text{ and } 12 \times 5 = 60\right)$

$\therefore y = 60$ $(\because 1 \times \text{ any number} = \text{the same number})$

When the value of y is 60, the two sides become equal.
$\therefore$ 60 is the solution of the given equation.

(ii) $18 = 3u$

$\frac{18}{3} = \frac{3u}{3}$ (Division property of equality)

$\therefore 6 = 1u$ $\left(\because \frac{18}{3} = 6 \text{ and } \frac{3}{3} = 1\right)$

$\therefore u = 6$ $(\because 1 \times \text{any number} = \text{the same number})$

When the value of u is 6, the two sides become equal.
$\therefore$ 6 is the solution of the given equation.