Maharashtra Board
Class VII
Mathematics
Sample Paper – 2
Solution

Time: 2.30 hrs **Total Marks: 60**

Q1.

1. $\frac{-23}{42} + \frac{23}{42} = \frac{-23+23}{42} = \frac{0}{42} = 0$

   Hence, the additive inverse of $\frac{-23}{42}$ is $\frac{23}{42}$.

2. Cost price = Selling price + Loss
   = Rs. (582 + 82)
   = Rs. 664
   So, the cost price is Rs. 664.

3. Segment PQ is congruent to Segment XY. This means, their lengths are equal.
   Hence, the length of segment XY is also 5.4 cm.

4. The three properties of a parallelogram are as follows:
   (i) Opposite sides of a parallelogram are equal.
   (ii) Opposite angles of a parallelogram are equal.
   (iii) Diagonals of a parallelogram bisect each other.

5. Side of the square table top = 40.4 cm
   Area of the square table top = side^2 = $(40.4)^2$ = 1632.16 cm^2
   Hence, the area of a square table top whose one side measures 40.4 cm is 1632.16 cm^2.

6. $(x + 5)(x - 5) = (x)^2 - (5)^2$
   $= x^2 - 25$

7. $36a^2b = 2 \times 2 \times 3 \times 3 \times a \times a \times b$
   Hence, the factors of $36a^2b$ are 2, 2, 3, 3, a, a and b.

8. Radius of a circle is a line joining the center of a circle to any point on the circumference of a circle. So, the radii drawn in the given figure are OP, OQ and OR.

9. Edge of the cubical block = 5.3 cm
   Total surface area = $6(\text{side})^2 = 6 \times (5.3)^2 = 6 \times 28.09 = 168.54\ \text{cm}^2$

10. Diagonals of a rhombus are perpendicular bisectors of each other.
    Hence, BD = 2 × OD = 2 × 4 cm = 8 cm.

11. $(4 + x)^2 = 4^2 + 2 \times 4 \times x + x^2$
    $= 16 + 8x + x^2$

12. Since, denominators of both the rational numbers are same, let us compare -25 and -41.
    Since, $-25 > -41$, we have $\frac{-25}{44} > \frac{-41}{44}$.

Q2.

1. $12pm + 18qm + 6pn + 9nq$
   $= \underline{12pm + 6pn} + \underline{18qm + 9nq}$
   $= 6p(2m + n) + 9q(2m + n)$
   $= (2m + n)(6p + 9q)$
   $= (2m + n)3(2p + 3q)$
   $= 3(2p + 3q)(2m + 3n)$

2. Area of the shaded region = Area of big square – Area of small square
   Now,
   Area of big square = side × side = 7 × 7 = 49 cm^2
   Area of small square = side × side = 3 × 3 = 9 cm^2
   Area of the shaded region = 49 − 9 = 40 cm^2

3.
   (i) We know that, angles are congruent if they measure the same angle. Thus the measure of the other angle will also be 18°.
   (ii) Given that the two line segments are congruent. Thus, line segment PQ will be equal to HG in length.

4. $\frac{-32}{9} \div \frac{8}{18}$
   $= \frac{-32}{9} \times \frac{18}{8}$
   $= \frac{-32 \times 18}{9 \times 8}$
   $= \frac{-4 \times 8 \times 9 \times 2}{9 \times 8}$
   $= -4 \times 2$
   $= -8$

5. 199^2
   $= (200 - 1)^2$
   $= 200^2 - 2 \times 200 \times 1 + 1^2$
   $= 40000 - 400 + 1$
   $= 39601$

6. Length of a tank = l = 7.5 m
   Breadth of a tank = b = 2.4 m
   Height of a tank = h = 3 m
   Volume of the tank = l × b × h
   = 7.5 × 2.4 × 3
   = 54 cu. m
   Thus, the tank will hold 54 cu. m of water.

7.
   (i) The diagonals of a rectangle are congruent.
   Hence, l(AC) = l(BD) = 3.6 cm

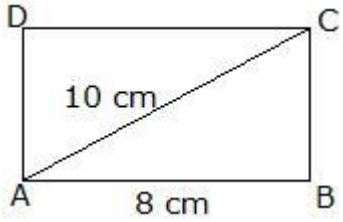
   (ii) The diagonals of a rectangle bisect each other.
   $l(OB) = \frac{1}{2} \times l(BD) = \frac{1}{2} \times 3.6 = 1.8$ cm
   $l(OC) = \frac{1}{2} \times l(AC) = \frac{1}{2} \times 3.6 = 1.8$ cm

8. For a finger ring box,
   Length = l = 6 cm
   Breadth = b = 4.5 cm
   Height = h = 3.5 cm
   Now, finger ring box is cuboidal in shape.
   Paper required to wrap the finger ring box
   = Total surface area of the finger ring box
   = 2(l × b + b × h + h × l)
   = 2(6 × 4.5 + 4.5 × 3.5 + 3.5 × 6)
   = 2(27 + 15.75 + 21)
   = 2 × 63.75
   = 127.5 sq. cm

Q3.

1. C.P of the sewing machine = Rs. 2500
   S.P of the sewing machine = Rs. 2700
   Profit = S.P. – C.P.
   = Rs. (2700 – 2500)
   = Rs. 200
   Now, profit percent $= \frac{\text{Profit}}{\text{C.P.}} \times 100 = \frac{200}{2500} \times 100 = 8$
   Hence, Julie incurred a profit of 8%.

2. Let ABCD be the given rectangle in which length AB = 8 cm and diagonal AC = 10 cm.
Since each angle of a rectangle is a right angle, ∠ABC = 90°.
In right angled triangle ABC,
$AB^2 + BC^2 = AC^2$
$\therefore BC^2 = AC^2 - AB^2 = (10)^2 - (8)^2 = 100 - 64 = 36$
$\therefore BC = \sqrt{36} = 6$ cm.
Hence, breadth of the rectangle is 6 cm.



3.
(i) Two pairs of congruent segments:
Seg GF ≅ Seg NM and Seg DG ≅ Seg KN

(ii) Two pairs of congruent angles:
∠E ≅ ∠L and ∠G ≅ ∠N

(iii) The statement □DEFG ≅ □KLMN is true.
The four sides of □DEFG are congruent to the corresponding four sides of □DEFG and the four angles of □KLMN are congruent to the corresponding four angles of □DEFG.
Hence, the statement □DEFG ≅ □KLMN is true.

4.
(i) School No. 3 planted the same number of trees every year.
(ii) School No. 2 planted more trees in 2007-08 than in 2006-07.
(iii) School No. 1 planted more trees in 2006-07 than in 2007-08.

5.
(i) $169p^2 - 81r^2 = (13p)^2 - (9r)^2$
$= (13p + 9r)(13p - 9r)$

(ii) $121 - 49n^2 = (11)^2 - (7n)^2$
$= (11 + 7n)(11 - 7n)$

6. Length of the floor, l = 6.6 m = 660 cm
Breadth of the floor, b = 4.5 m = 450 cm
$\therefore$ Area of the floor = l × b = (660 × 450) sq. cm
Side of the square tile = 30 cm,
$\therefore$ Area of the square tile = $(side)^2 = (30)^2 = (30 \times 30)$ sq. cm
Now, number of tiles required = $\frac{\text{Area of the floor}}{\text{Area of the square tile}}$
$= \frac{660 \times 450}{30 \times 30}$
$= 330$
Thus, 330 square tiles will be required.

7. Length of a classroom = l = 8 m
   Breadth of a classroom = b = 7 m
   Height of a classroom = h = 3 m

   Volume of the classroom = l × b × h = 8 × 7 × 3 = 168 cu. m
   Volume of the air = Volume of the classroom = 168 cu. M

$$\text{Average volume of air available to each child} = \frac{\text{Volume of the air}}{\text{Number of children}}$$
$$= \frac{168}{42}$$
$$= 4 \text{ cu. m}$$

   Thus, the average volume of air available to each child is 4 cu. m.

Q4.

1. S.P. of car = Rs. 3,45,600
   Profit = 8%
   ∴ When the cost price is 100, selling price = 100 + 8 = Rs. 108
   Suppose the cost price of the car is Rs. x.

   Ratio of cost prices = Ratio of selling prices

$$\therefore \frac{x}{100} = \frac{345600}{108}$$
$$\therefore x = \frac{345600}{108} \times 100 \text{ .... (Multiplying both sides by 100)}$$
$$\therefore x = 320000$$

   Hence, Maniklal had bought the car for Rs. 3,20,000.

2.
   (i) False.
   Correct statement: An angle in a semicircular region is a <u>right angle</u>.

   (ii) False.
   Correct statement: The angle in a minor segment of a circle is an <u>obtuse angle.</u>

   (iii) False
   Correct statement: The angle in a major segment of a circle is an <u>acute angle.</u>

   (iv) True

3. $p(p - 4) = p^2 - 4p$
   Substituting p = 0, we have
   L.H.S. = $p(p - 4) = 0(0 - 4) = 0$
   R.H.S. = $p^2 - 4p = 0 - 4(0) = 0$
   $\therefore$ L.H.S. = R.H.S.

   Substituting p = 1, we have
   L.H.S. = $p(p - 4) = 1(1 - 4) = -3$
   R.H.S. = $p^2 - 4p = 1^2 - 4(1) = 1 - 4 = -3$
   $\therefore$ L.H.S. = R.H.S.

   Substituting p = 2, we have
   L.H.S. = $p(p - 4) = 2(2 - 4) = 2(-2) = -4$
   R.H.S. = $p^2 - 4p = 2^2 - 4(2) = 4 - 8 = -4$
   $\therefore$ L.H.S. = R.H.S.

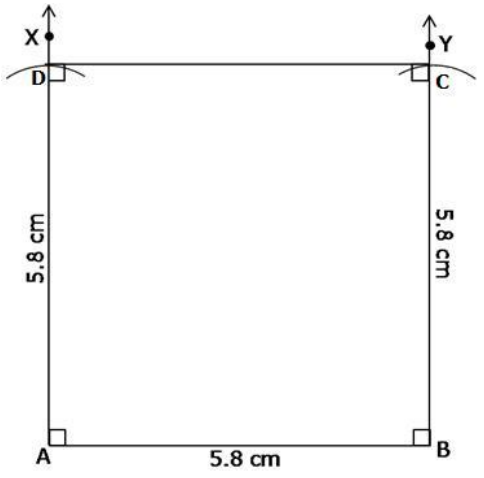
   Substituting p = 3, we have
   L.H.S. = $p(p - 4) = 3(3 - 4) = 3(-1) = -3$
   R.H.S. = $p^2 - 4p = 3^2 - 4(3) = 9 - 12 = -3$
   $\therefore$ L.H.S. = R.H.S.

   Hence, $p(p - 4) = p^2 - 4p$ is an identity.

4.
   (i) $am + an + al + bm + bl + bn$
   $= \underline{am + an + al} + \underline{bm + bl + bn}$
   $= a(m + n + l) + b(m + n + l)$
   $= (a + b)(m + n + l)$

   (ii) $ab + cd + ac + bd$
   $= \underline{ab + ac} + \underline{bd + cd}$
   $= a(b + c) + d(b + c)$
   $= (a + d)(b + c)$

5. Steps of construction:
   i. Draw a seg AB of length 5.8 cm.
   ii. Using a protractor draw a ray AX $\perp$ AB at point A.
   iii. Using a protractor draw a ray BY $\perp$ AB at point B.
   iv. Taking A as the centre and radius equal to AB, draw an arc to cut ray AX at D.
   v. Taking B as the centre and the same radius, draw an arc to cut ray BY at C.
   vi. Draw CD.
   ABCD is the required square.



Q5.

1.

(i) The number of literate women is the greatest in village C.
(ii) The number of literate and illiterate women is same in village B.
(iii) The number of illiterate women in village C is 400.
(iv) Number of literate women in village D = 500

Number of illiterate women in village D = 700

Now, in village D,
Number of illiterate women – Number of literate women
= 700 – 500
= 200
Hence, in village D, the number of illiterate women exceeds the number of literate women by 200.

(v) The number of literate women is the least in village D.

2. For the wall,

l = 4.8 m = 480 cm, b = 30 cm, h = 3 m = 300 cm

For the brick:
l = 20 cm, b = 12 cm, h = 7.5 cm

Volume of the wall = l × b × h = (480 × 30 × 300) cu. cm
Volume of each brick = l × b × h = (20 × 12 × 7.5) cu. cm

$$\text{Number of bricks} = \frac{\text{Volume of the wall}}{\text{Volume of the brick}}$$

$$= \frac{480 \times 30 \times 300}{20 \times 12 \times 7.5}$$

$$= 2400$$

2400 bricks will be the required to build the wall.