Maharashtra Board
Class VII
Mathematics
Sample Paper – 3
Solution

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

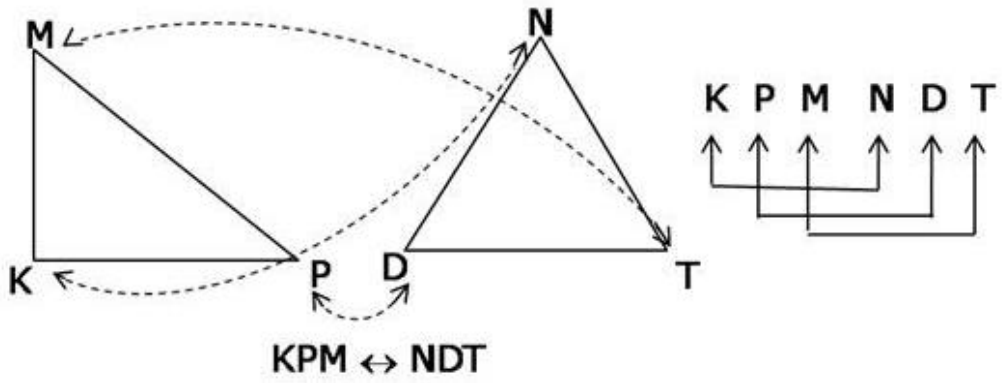
min Q1.

1. ∠ACD and ∠ABD are angles in the same segment.
   We know that angles in the same segment are congruent.
   Hence, m∠ACB = m∠ADB = 45°.

2. Loss = Cost price – Selling price
   ∴ Selling price = Cost price – Loss = Rs. (897 – 190) = Rs.707

3. Area of the rectangular mirror
   = length × breadth
   = 100.5 × 56.4 cm^2
   = 5668.2 cm^2
   Hence, area of the mirror is 5668.2 cm^2.

4. The given one to one correspondence between the vertices is shown below using arrows.

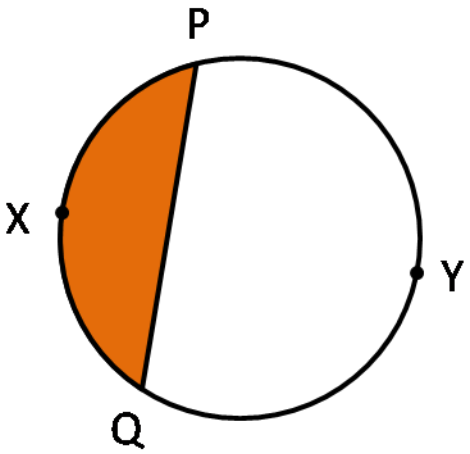


5. $(4 - x)^2$
   $= 4^2 - 2 \times 4 \times x + x^2$
   $= 16 - 8x + x^2$

6. 144mn – 48m
   = 12 × 4 × 3 × m × n – 12 × 4 × m
   = 12 × 4 × m(3 × n – 1)
   = 48m(3n – 1)

7. Diagonals of a rectangle are equal in length.
   Hence, the length of the other diagonal is also 10.6 cm.

8. The shaded part i.e. segment PXQ is the minor segment and the unshaded part i.e. segment PYQ is the major segment of the given circle.



9. Total surface area of a cube = 6 × Area of one face
   = 6 × 24 cm^2
   = 144 cm^2

10. $45x^2y = 3 \times 3 \times 5 \times x \times x \times y$
    $65y^2 = 13 \times 5 \times y \times y$
    $\therefore$ Common factors of $45x^2y$ and $65y^2$ are 5 and y.

11. $-100 \times \frac{-1}{100} = 1$

    Hence, the multiplicative inverse of -100 is $-\frac{1}{100}$.

12. The quadrilateral which has only one pair of parallel sides is called a trapezium.

Q2.

1. Given cost price of the refrigerator = Rs. 12,500
   Money spent on repairs = Rs. 947
   Money spent on transport = Rs. 450
   Total cost price = Rs. (12500 + 947 + 450) = Rs.13,897

   Now, selling price of the refrigerator = Rs. 10, 478
   Here, selling price < cost price, therefore, Mr Shah incurred a loss.

   Loss = Cost price − Selling price = Rs. (13897 − 10478) = Rs. 3419
   Hence, Mr. Shah incurred a loss of Rs. 3419.

2. L.H.S. = $(x - y)(x + y)$

$= \left(\frac{3}{2} - \frac{1}{2}\right)\left(\frac{3}{2} + \frac{1}{2}\right)$

$= \left(\frac{3-1}{2}\right)\left(\frac{3+1}{2}\right)$

$= \frac{2}{2} \times \frac{4}{2}$

$= 2$

R.H.S. = $x^2 - y^2$

$= \left(\frac{3}{2}\right)^2 - \left(\frac{1}{2}\right)^2$

$= \frac{9}{4} - \frac{1}{4}$

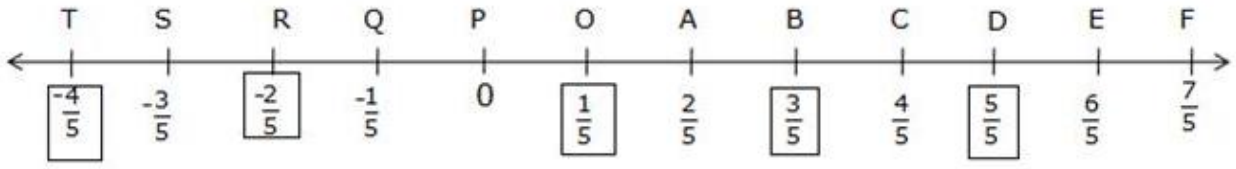
$= \frac{9-1}{4}$

$= \frac{8}{4}$

$= 2$

Since L.H.S. = R.H.S., we have verified the identity $(x - y)(x + y) = x^2 - y^2$

3.



4. 57×63

$= (60 - 3)(60 + 3)$

$= (60)^2 - (3)^2$

$= 3600 - 9$

$= 3591$

5. Total area of the garden plot

$= 80 \times 45$

$= 3600\ m^2$

Area of the garden excluding the pathway

$= (80 - 4) \times (45 - 4)$

$= 76 \times 41$

$= 3116\ m^2$

$\therefore$ Area of the pathway = $(3600 - 3116) = 484\ m^2$

6. Length of a road = l = 1.8 km = 1.8 × 1000 = 1800 m
   Breadth of a road = b = 8 m
   Height of a road = h = 15 cm = (15 ÷ 100) m = 0.15 m
   Now, volume of the road metal required
   = Volume of the road
   = l × b × h
   = 1800 × 8 × 0.15
   = 2160 cu. m
   Thus, 2160 cu. m of road metal is required.

7. Let x be one the three equal angles.
   Sum of all the angles of a quadrilateral = 360^o
   $\Rightarrow x + x + x + 60^o = 360^o$
   $\Rightarrow 3x = 360^o - 60^o$
   $\Rightarrow 3x = 300^o$
   $\Rightarrow x = 100^o$
   Thus, the measure of each of the equal angles of a quadrilateral is 100^o.

8. Figure (1):
   In ΔPQR and ΔXYZ,
   Side QR ≅ Side YZ
   Side PQ ≅ Side XZ
   Side PR ≅ Side XY
   P ↔ X, Q ↔ Z and R ↔ Y
   Thus, ΔPQR and ΔXYZ are congruent by the correspondence PQR ↔ XZY.

   Figure (2):
   In ΔABC and ΔDEF,
   Side AC ≅ Side DF
   Side AB ≅ Side FE
   Side BC ≅ Side DE
   A ↔ F, B ↔ E and C ↔ D
   Thus, ΔABC and ΔDEF are congruent by the correspondence ABC ↔ FED.

Q3.

1. C.P. of a washing machine = Rs. 10000, Loss = 12%
   ∴ When the cost price is 100, selling price = 100 – 12 = Rs. 88
   Suppose the selling price of the washing machine is Rs. x.
   Ratio of cost prices = Ratio of selling prices
   $\therefore \frac{10000}{100} = \frac{x}{88}$
   $\therefore x = \frac{10000}{100} \times 88$ ....(Multiplying both sides by 100)
   $\therefore x = 8800$
   Hence, Damuseth sold the washing machine for Rs. 8800.

2. In Δ LMN and Δ TUV,
   (i) Three pairs of congruent angles: ∠LMN ≅ ∠UVT, ∠MNL ≅ ∠VTU and ∠MLN ≅ ∠VUT
   (ii) Three pairs of congruent sides: Side LM ≅ Side UV, Side MN ≅ Side VT and Side LN ≅ Side UT

3. Let $-10 = \frac{-10}{1} = \frac{a}{b}$ and $\frac{-83}{9} = \frac{c}{d}$

   Then,
   $a \times d = -10 \times 9 = -90$
   $b \times c = 1 \times (-83) = -83$
   As $-90 < -83$, $a \times d < b \times c$
   $\therefore \frac{a}{b} < \frac{c}{d}$
   $\therefore -10 < \frac{-83}{9}$

4.
   (i) The angles in the minor segment PRQ are ∠PAQ and ∠PBQ.
   (ii) The angles in the major segment PTQ are ∠PDQ and ∠PCQ.
   (iii) The pairs of angles in the minor segment PRQ are ∠PAQ and ∠PBQ and the pairs of angles in the major segment PTQ are ∠PDQ and ∠PCQ.

5. Length of the plot, l = 75.5 m
   Breadth of the plot, b = 30.5 m
   Area of the plot = l × b
   = 75.5 × 30.5
   = 2302.75 sq. m

   Rate per sq. m = Rs. 550
   ∴ Selling price of the plot = Rate × Area
   = Rs. (550 × 2302.75)
   = Rs. 1266512.50
   Thus, the selling price of the plot is Rs. 1266512.50.

6. C.P. of a cupboard = Rs. 6500, Profit = 15%
   ∴ When the cost price is 100, selling price = 100+ 15= Rs. 115
   Suppose the selling price of a cupboard is Rs. x.
   Ratio of cost prices = Ratio of selling prices
   $\therefore \frac{6500}{100} = \frac{x}{115}$
   $\therefore x = \frac{6500}{100} \times 115$ ....(Multiplying both sides by 100)
   $\therefore x = 7475$
   Hence, to get a 15% profit, the cupboard should be sold at Rs. 7475.

7.

(i) The number of voters registered at Jawahar Vidyalaya center is 700 and the actual number of votes cast is 450.

(ii) The City High School has the largest number of registered voters.

(iii) The highest number of votes was cast at the Remand Home polling center.

Q4.

1.

(i) Part I is a rectangle having length = (4.5 − 1) = 3.5 cm and breadth = 1 cm

$\therefore$ Area of part I = length × breadth = 3.5 × 1 = 3.5 sq. cm

(ii) Part II is a square with side length = 1 cm

$\therefore$ Area of part II = $(\text{side})^2 = (1)^2$ = 1 sq. cm

(iii) Part III is a rectangle with length = 6.5 cm and breadth = 1 cm

$\therefore$ Area of part III = length × breadth = 6.5 × 1 = 6.5 sq. cm

(iv) Part IV is a rectangle with length = 6.5 cm and breadth = (4.5 − 1) = 3.5 cm

$\therefore$ Area of part IV = length × breadth = 6.5 × 3.5 = 22.75 sq. cm

2.

(i) Side of a cube = l = 6.8 m

Total surface area of a cube = $6l^2 = 6(6.8)^2$

$= 6 \times 6.8 \times 6.8$

$= 277.44$ sq. m

(ii) Side of a cube = l = 9.3 cm

Total surface area of a cube = $6l^2 = 6(9.3)^2$

$= 6 \times 9.3 \times 9.3$

$= 518.94$ sq. cm

3.

(i) The number of people getting the benefit of the EGS in village R

= Number of men getting the benefit in village R + Number of women getting the benefit in village R

= 170 + 50

= 220

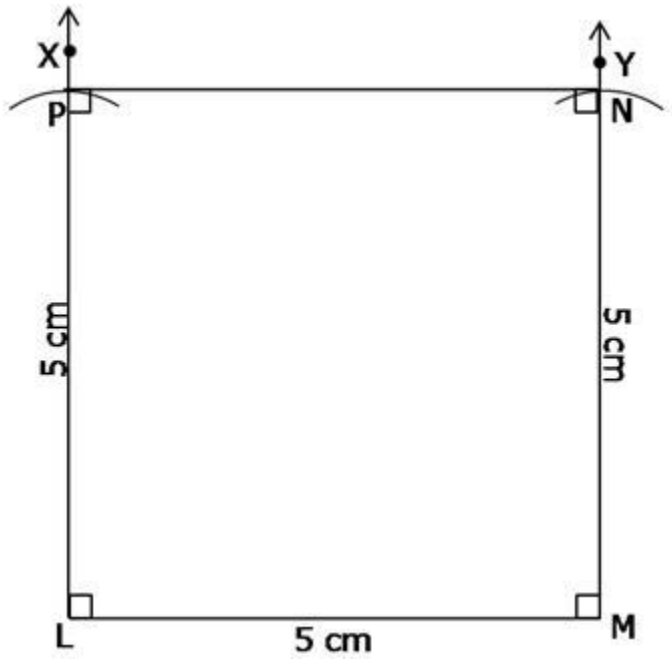
(ii) Village Q has the most women beneficiaries.

(iii) In village S, there are 80 men beneficiaries and 120 women beneficiaries.

(iv) Village P has more men beneficiaries.

4. Steps of construction:
   1. Draw seg LM of any length, say, 5 cm.
   2. Using a protractor draw a ray LX $\perp$ LM at point L.
   3. Using a protractor draw a ray MY $\perp$ LM at point M.
   4. Taking L as the centre and radius equal to LM, draw an arc to cut ray LX at P.
   5. Taking M as the centre and the same radius, draw an arc to cut ray MY at N.
   6. Join PN.

   Thus, LMNP is the required square.



5.

(i) $1 - \frac{36m^2}{49n^2}$

$= (1)^2 - \left(\frac{6m}{7n}\right)^2$

$= \left(1 + \frac{6m}{7n}\right)\left(1 - \frac{6m}{7n}\right)$

(ii) $1 - 8a + 16a^2$

$= (1)^2 - 2 \times 4 \times a + (4a)^2$

$= (1 - 4a)^2$

$= (1 - 4a)(1 - 4a)$

Q5.

1. Total surface area of the wooden cube-shaped box = 486 sq.cm
   Now, total surface area of a cube = $6l^2$
   $\therefore 486 = 6l^2$
   $\therefore l^2 = \frac{486}{6}$
   $\therefore l^2 = 81$
   $\therefore l = 9$ cm

   Volume of the box = $l^3 = (9)^3 = 9 \times 9 \times 9 = 729$ cu. cm

   Cost to laminate 1 sq. cm = Rs. 1.50
   $\therefore$ Cost to laminate 486 sq. cm = Rs. (1.50 × 486) = Rs. 729

2.

Subject	Maths	Science	History	English
Snehal's score	80	64	70	85
Vicky's Score	65	72	80	60