Goa Board
Class VII Mathematics
Sample Paper – 5 Solution

Time: 3 hours   **Total Marks: 90**

Section A

1. Correct answer: A
   $(128 \div 32) \div (-4)$
   $= 4 \div (-4)$
   $= -1$

2. Correct answer: A
   Total cost = 2.40 × 10 = Rs. 24

3. Correct answer: B
   The given observations can be arranged in ascending order as
   4, 6, 9, 10, 11, 12 and 18
   Here, number of observations = 7 (odd)
   Median = Middle observation = 10

4. Correct answer: A
   $2x + 3 = 7$
   If we will transpose 3 to RHS, then the term with variable will remain on one side and the constants will be on other side.
   So, the first step is to transpose 3 to RHS.
   i.e. $2x = 7 - 3$

5. Correct answer: C
   $\angle BCA = 180° - 150° = 30°$ (linear pair angles)
   Also, $\angle B = \angle BCA = 30°$ (Angles opp. to equal sides are equal)
   $\Rightarrow \angle A = 180° - 30° - 30° = 120°$ (Using angle sum property of triangle)

6. Correct answer: B
   Increased amount =
   $Rs. \dfrac{12}{100} \times 54 = Rs. 6.48$

7. Correct answer: C

$$2\frac{2}{3} = \frac{8}{3}$$

So the multiplicative inverse is $\frac{3}{8}$.

8. Correct answer: D

The triangle ABC is a right angled triangle, by Pythagoras theorem, we have: $c^2 = a^2 + b^2$

9. Correct answer: B

Area of a parallelogram = Base × corresponding height = 144cm²

⇒ Height of the parallelogram = $\frac{area}{base} = \frac{144}{18} = 8cm$

10. Correct answer: B

21b - 32 + 7b - 20b = 21b + 7b - 20b – 32 = 8b – 32

11. Correct answer: B

The given number 4200 can be factorised as

4200 = 2 × 2 × 2 × 3 × 5 × 5 × 7

      = $2^3 \times 3 \times 5^2 \times 7$

12. Correct answer: C

For regular polygon,

Angle of rotation = $\dfrac{360^o}{\text{Number of sides}}$

i.e. Angle of rotation for a square = $\dfrac{360^o}{4} = 90^o$

Section B

13. Average score = mean score

$\text{Mean} = \dfrac{\text{Sum of all observations}}{\text{Total number of observations}}$

$= \dfrac{12+23+10+77+15+78+90+54+23+10+1}{11}$

$= \dfrac{393}{11}$

$= 35.7$

14. Pie filling made in 1 minute = 9.2 kg
    Pie filling made in 6 minutes = 6 × 9.2 kg = 55.2 kg

15. Distance travelled with 1 gallon = $10\dfrac{2}{3} = \dfrac{32}{3}$ miles

    Distance travelled with $5\dfrac{1}{2} = \dfrac{11}{2}$ gallons.

    $= \dfrac{11}{2} \times \dfrac{32}{3}$ miles

    $= 11 \times \dfrac{16}{3}$ miles

    $= \dfrac{176}{3}$ miles

    Thus, Sam can go $\dfrac{176}{3}$ miles with $\dfrac{11}{2}$ gallons.

16. ASA congruence criterion:
    The Angle Side Angle (ASA) postulate states that if under correspondence, two angles and the included side of a triangle is equal to two corresponding angles and included side of another triangle, then the two triangles are congruent.
    Consider the triangles ABC and XYZ as shown below.
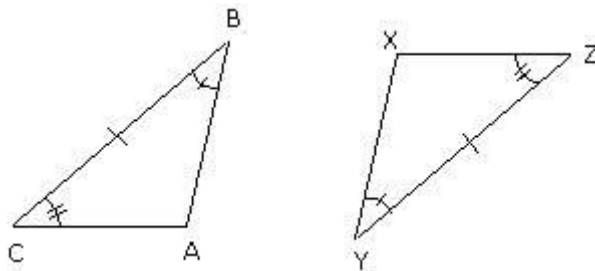
    Two angles and the included side are congruent.
    $\angle ABC = \angle XYZ$ (equal angle)
    BC = YZ (equal side)
    $\angle ACB = \angle XZY$ (equal angle)
    So, $\triangle ABC \cong \triangle XYZ$

    Therefore, by the ASA congruence criterion, the triangles are congruent.

17. Let A and B be the two numbers such that,

40% of A = $\dfrac{2}{3}$ B

Then,

$\dfrac{40A}{100} = \dfrac{2B}{3}$

$\Rightarrow \dfrac{2A}{5} = \dfrac{2B}{3}$

$\Rightarrow \dfrac{A}{B} = \left(\dfrac{2}{3} \times \dfrac{5}{2}\right) = \dfrac{10}{3}$

$\therefore A:B = 5:3$

18. The formula for finding the circumference of a circle is as shown below:

Circumference of a circle = $2\pi r$

Here, diameter (d) = 9 cm

Thus, radius (r) = $\dfrac{d}{2} = \dfrac{9}{2}$ = 4.5 cm

Then, circumference = 2 × 3.14 × 4.5   (π = 3.14)

= 2 × 14.13

= 28.26 cm

So, the circumference of the circle = 28.26 cm
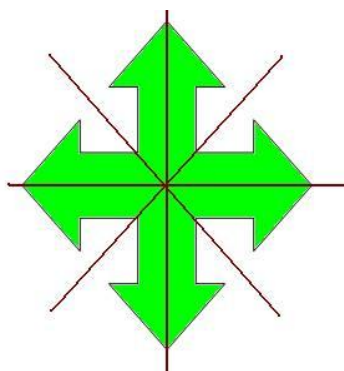
19. (4x - 3y) - (3x - 4y)

= 4x - 3y - 3x + 4y

= (4x - 3x) + (-3y + 4y)

= x + y

20. The diagram has 4 lines of symmetry as shown below:

After rotating the diagram through 90°, we find that the image remains same. So, the order of rotational symmetry is 4.

Section C

21. Here, ∠SPQ + ∠PSR = 180° (interior angles on the same side of the transversal are
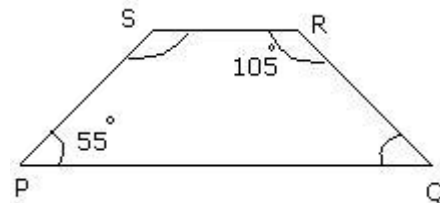   supplementary)
    55° + ∠PSR = 180°
    ∠PSR = 125°
    ∠SRQ + ∠RQP = 180° (interior angles on the same side
    of the transversal are supplementary)
    105° + ∠RQP = 180°
    ∠RQP = 75°

22. Let the third side = x
    Two equal sides are 2x - 5, 2x - 5
    Perimeter = Sum of all sides = 55 m
    i.e. x + 2x - 5 + 2x - 5 = 55
    5x - 10 = 55
    5x = 55 + 10
    5x = 65
    x = 13
    Two equal sides = 2x - 5 = 2 × 13 - 5 = 26 - 5 = 21
    Thus, the lengths of three sides are 13 m, 21 m and 21 m.

23. In the given figure, ∠BAC = 90° and ∠ABC = 52°
    Thus, using angle sum property of triangle, we get
    ∠ABC + ∠BAC + y = 180°
    ⇒ 52° + 90° + y = 180°
    ⇒ 142° + y = 180°
    ⇒ y = 38°

    Now using exterior angle property, we get
    z = ∠ABC + ∠BAC = 52° + 90° = 142°
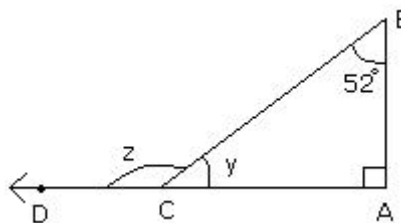
24. Let the distance travelled towards north be denoted by a positive sign.
So, the distance travelled towards south would be denoted by negative sign.
Thus, distance travelled by Rahul from A is given by:

$$\frac{2}{5}+\left(-1\frac{1}{2}\right)=\frac{2}{5}+\left(\frac{-3}{2}\right)$$

$$=\frac{2\times2}{5\times2}+\left(-\frac{3\times5}{2\times5}\right)$$

$$=\frac{4}{10}+\left(-\frac{15}{10}\right)$$

$$=\frac{4-15}{10}=\frac{-11}{10}=-1\frac{1}{10}$$

Since it is negative, it means Rahul is at a distance of $1\frac{1}{10}$ km towards south of point
A.

25. Principal, P = Rs. 12500
Amount, A = Rs. 15500
Thus, S.I. = Rs. (A - P) = Rs. (15,500 – 12,500) = Rs. 3,000.

$$\text{Rate}=\left(\frac{100\times\text{SimpleInterest}}{\text{Principal}\times\text{Time}}\right)\%$$

$$\text{Rate}=\left(\frac{100\times3000}{12500\times4}\right)\%$$

Rate=6%

26.

Steps of construction:
1. Draw a triangle ABC of any measure.
2. Taking C as a center and a small radius draw an arc which cut CB and CA at P and
Q, respectively.
3. With the same radius and centre A draw an arc which cut AC at R.
4. Measure the arc PQ using compass and cut the same arc length RS.
5. Join AS and extend to X.
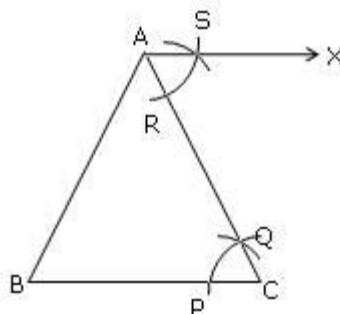
27. The area of the shaded region can be obtained by removing the area of the small square from the area of the big square.
    Area of big square = 7 × 7 = 49 cm²
    Area of small square = 3 × 3 = 9 cm²
    Thus, area of the shaded region = 49 – 9 = 40 cm²

28. Eggs produced by the poultry farm = 600
    Eggs delivered to each shop = 600 ÷ 10 = 60
    Money earned by a particular shopkeeper = Rs. 276
    Money earned if all eggs were good = 60 × 5 = Rs. 300
    Money loosed due to rotten eggs = 300 - 276 = Rs. 24
    Cost that shopkeeper will give for one rotten egg = Rs. 2
    Number of rotten eggs = 24 ÷ 2 = 12
    Hence, 12 eggs were rotten.

29. Coefficient of x is:
    (i) 2 - z
    (ii) z^3
    (iii) 2

30. C.P. of cycle = Rs. 1400
    Loss% = 5%
    Therefore, S.P. of cycle
    $$= \frac{100 - loss\%}{100} \times CP$$
    $$= \frac{100 - 15}{100} \times 1400$$
    $$= \frac{85}{100} \times 1400$$
    $$= Rs.1190$$

Section D

31. Calculation is as follows:

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Total number of observations}}$$

As the number of observations are odd (5)

$$\text{Median} = \left(\frac{n+1}{2}\right)^{th} = \left(\frac{5+1}{2}\right)^{th} = 3^{rd} \text{ observation}$$

Mode = Most occurring value

For India,

$$\text{Thus, Mean} = \frac{35 + 25 + 30 + 19 + 19}{5} = \frac{128}{5} = 25.6$$

Arranging data in ascending order: 19, 19, 25, 30, 35

Thus, Median = 3rd observation = 25

Mode = 19 (occurring twice)

Team	Goals	Goals	Goals	Goals	Goals	Mean	Median	Mode
India	35	25	30	19	19	25.6	25	19
Sri Lanka	45	25	14	13	14	22.2	14	14
China	32	18	14	21	21	21.2	21	21

32. Steps of construction:

1. Draw a line segment PQ = 5.7 cm.

2. Draw an angle of 45° at P and 30° at Q and let them intersect at R.

3. Thus, PQR is the required triangle.
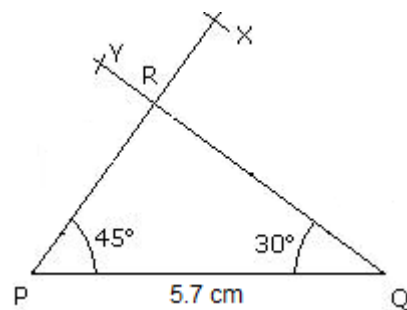
33. We can show the diagram as below:
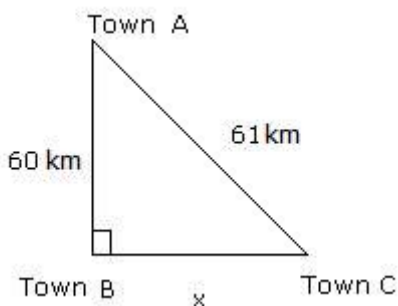
Let the road that connects towns B and C be x.

Applying Pythagoras theorem, we get
  h = 61, b = x and p = 60

$p^2 + b^2 = h^2$

$60^2 + x^2 = 61^2$

$3600 + x^2 = 3721$ (subtract 3600 from both sides)

$x^2 = 121$

$x^2 = 11^2$

Thus, x = 11

Length of the road that connects towns B and C is 11 km.

34. Let C.P. be Rs. x.

    If SP = Rs. 1920, then

    $$\text{Profit \%} = \frac{\text{Profit}}{\text{CP}} \times 100$$

    Thus, Profit % = $\dfrac{1920 - x}{x} \times 100$

    If SP = Rs 1280, then

    $$\text{Loss \%} = \frac{\text{Loss}}{\text{CP}} \times 100$$

    Thus, loss % = $\dfrac{x - 1280}{x} \times 100$

    As given in the question,

    $$\frac{1920 - x}{x} \times 100 = \frac{x - 1280}{x} \times 100$$
    $$\Rightarrow 1920 - x = x - 1280$$
    $$\Rightarrow 2x = 3200$$
    $$\Rightarrow x = 1600$$

    Therefore, required SP = 125% of Rs. 1600
    i.e.
    $$Rs. \left(\frac{125}{100} \times 1600 \right) = Rs.2000$$

35. Given, radius of the outer circle = 12 cm.
    So, area of the outer circle = πr^2 = 3.14 × 12² = 452.16 cm²
    Radius of the inner circle = 7 cm
    Area of the inner circle = πr^2 = 3.14 × 7² = 154 cm²
    Thus, the required area of the shaded portion = Area of the outer circle - Area of the inner circle = 452.16 - 154 = 298.16 cm²

36. Pitchers of caffeinated coffee sold on Sunday = $4\dfrac{7}{12}$

Pitchers of decaffeinated coffee sold on Sunday = $3\dfrac{1}{4}$

Total numbers of pitchers of coffee sold in all = $4\dfrac{7}{12} + 3\dfrac{1}{4}$

Changing mixed fraction into improper fractions:

$$= \frac{55}{12} + \frac{13}{4}$$
$$= \frac{55}{12} + \frac{13 \times 3}{4 \times 3}$$
$$= \frac{55}{12} + \frac{39}{12}$$
$$= \frac{94}{12}$$
$$= \frac{47}{6} = 3\frac{1}{4}$$

Thus, total pitchers of coffee sold on Sunday = $\dfrac{47}{6}$

37. Multiply (3a + 3b) by (2a – 2b). Verify the result for a = 2 and b= (-2)
    (3a + 3b) by (2a – 2b)= 3a(2a – 2b) + 3b(2a – 2b)= 6a² – 6ab + 6ab – 6b² = 6(a² – b²)
    For a = 2, b = - 2
    $\Rightarrow$[(3a + 3b)(2a – 2b)] = [(0)(8)] = 0
    $\Rightarrow$6(a² – b²) = 6(4 - 4) = 0

38. Let the length of the rectangle be L and let the breadth be B.
    According to the given condition,
    L = 6 + B
    Perimeter of the rectangle = 2(L +B) = 2 (6 + B + B) = 2(6 + 2B)
    $\Rightarrow$ 96 = 2(6+ 2B)
    $\Rightarrow \dfrac{96}{2}$ = 6 + 2B
    $\Rightarrow$ 48 = 6 +2B
    $\Rightarrow$ 48 - 6 = 2B
    $\Rightarrow$ 42 = 2B
    $\Rightarrow$ B = 21
     L = 6 + B = 6 +21 = 27
    The length of the rectangle is 27 cm and breadth is 21 cm.