Class: VIII SUMMATIVE ASSESSMENT

TERM II 2025-26 MATHEMATICS

Time: 1 ½ Hrs. Score: 40

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Instructions

- Use the first 15 minutes to read the questions and think about answers.
- There are 16 questions, split into 4 parts A, B, C, D.
- Answer all questions; but in questions of the type A or B you need answer only one of those.
- Answers must be explained, whenever necessary.

Section A

This section has 4 questions of score 1 each. Select the correct answer.

1. If the perpendicular bisector of a chord AB cuts the chord at M and passes through the center O, which of the following statements is **false**? A) $\angle OMA = 90^\circ$ B) $AM = MB$ C) $OA = OB$ D) $OM = AB$
2. The decimal form of $\frac{1}{7}$ is the repeating block $0.142857...$. What is the digit at the 8^{th} decimal place? A) 1 B) 4 C) 2 D) 8
3. The sum of two numbers is 10 and their difference is -2. What are the numbers? A) 6 and 4 B) 4 and 6 C) 6 and -4 D) 4 and 8
4. If the sides of a triangle are doubled, the area becomes: A) Doubled B) Tripled C) Quadrupled D) Halved

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Section B

This section has 4 questions of score 2 each.

5. Prove that: $-(x - y) = y - x$ using the numbers $x = 5$ and $y = 8$.
6. In a rectangle, the diagonal is 13 cm and one side is 12 cm. Find the length of the other side using the property of right-angled triangles.

7. A 10-meter long string is cut into two pieces in the ratio $2:3$. Find the length of the longer piece.

8. Find the decimal form of the sum: $\frac{1}{5}+\frac{1}{5^2}+\frac{1}{5^3}$.

Section C

This section has 4 questions of score 3 each.

9. **A)** A bird flock problem: "Twice our number, plus half of us, plus a quarter of us, plus 1 equals 100." (i) Write the algebraic equation for this statement taking the number of birds as x. (ii) Solve for x.

   OR

   B) The perimeter of a rectangle is 48 meters. The length is twice the width. (i) Form an equation using variable w for width. (ii) Find the length and width. (iii) Calculate the area of the rectangle.

10. Draw a circle of radius 3 cm. Draw a chord of length 4 cm. Construct the perpendicular bisector of this chord. Does it pass through the center? Verify by measurement.

11. **A)** In $\triangle ABC$, D is a point on BC such that $BD:DC=3:2$. (i) If the area of $\triangle ABD$ is $30\ \text{cm}^2$, what is the area of $\triangle ADC$? (ii) What is the ratio of the area of $\triangle ABD$ to the area of the whole triangle $\triangle ABC$?

    OR

    B) Two angles of a triangle are in the ratio $2:3$. The third angle is 80°. Find the measures of the other two angles.

12. Write the fraction $\frac{3}{11}$ in decimal form. Identify the repeating block of digits.

Section D

This section has 4 questions of score 4 each.

13. **A)** Draw a triangle with sides 5 cm, 6 cm, and 7 cm. Construct its circumcircle. Measure the circumradius (distance from circumcenter to a vertex).

    OR

    B) (i) Draw a line segment $PQ=7$ cm. (ii) Without using a ruler to measure, find the point R on PQ such that $PR:RQ=3:4$ using the concept of bisectors (halving repeatedly). (Hint: Divide the line into equal parts).

14. An object is thrown upwards. Its speed v at time t is given by $v=39.2-9.8t$. (i) What is the speed at $t=2$ seconds? (ii) At what time t will the speed be 0? (iii) What is the speed at $t=5$ seconds? What does the negative sign indicate?

15. **A)** (i) Draw a rhombus with diagonals 6 cm and 8 cm. (ii) Prove that the four triangles formed by the diagonals are congruent right-angled triangles. (iii) Calculate the perimeter of the rhombus.

    OR

    B) Draw an angle of 75° using a ruler and compass. (Hint: Construct 60° and bisect the remaining 30° between 60° and 90°, or add 15° to 60°).

16. **A)** In a mixture of 60 liters of milk and water, the ratio of milk to water is $2:1$. (i) How much water must be added to make the ratio $1:2$? (ii) If instead of water, milk is added to the original mixture to make the ratio $3:1$, how much milk is needed?

    OR

    B) The ratio of the length to breadth of a rectangular plot is $5:3$. A path 2 meters wide runs all around the outside of the plot. (i) If the length of the inner plot is $5x$, what is the length of the outer boundary in terms of x? (ii) If the perimeter of the inner plot is 160 meters, find the dimensions of the inner plot. (iii) Find the ratio of the perimeter of the inner plot to the perimeter of the outer boundary.

ANSWER KEY

Score: 40

Section A (1 Score each)

1. **D)** $OM = AB$
    - **Explanation:** While the perpendicular from the center bisects the chord ($AM = MB$) and forms a right angle ($OMA = 90$), and radii are equal ($OA = OB$), there is no rule stating the distance from the center (OM) must equal the chord length (AB). It varies based on the chord's position.
2. **B) 4**
    - **Explanation:** The repeating block is 142857 (6 digits).
    - $8 \div 6$ gives a remainder of 2.
    - The 2nd digit in the block 1**4**2857 is 4 .
3. **B) 4 and 6**
    - **Explanation:** Let numbers be x, y. $x + y = 10$, $x - y = -2$. Adding equations: $2x = 8 \Rightarrow x = 4$. Then $4 + y = 10 \Rightarrow y = 6$.
4. **C) Quadrupled**

- **Explanation:** If sides are scaled by factor k (here $k = 2$), area scales by k^2. $2^2 = 4$. The area becomes 4 times the original .

Section B (2 Scores each)

5. **Answer:**
   - LHS: $-(5 - 8) = -(-3) = 3$.
   - RHS: $8 - 5 = 3$.
   - Since LHS = RHS, the statement is proved.
6. **Answer: 5 cm**
   - **Explanation:** Using Pythagoras theorem in the right triangle formed by the diagonal: $a^2 + b^2 = d^2$.
   - $12^2 + x^2 = 13^2 \Rightarrow 144 + x^2 = 169$.
   - $x^2 = 25 \Rightarrow x = 5$.
7. **Answer: 6 meters**
   - **Explanation:** Ratio $2 : 3$. Total parts $2 + 3 = 5$.
   - Length of longer piece = $\frac{3}{5} \times 10 = 3 \times 2 = 6$ m .
8. **Answer: 0.248**
   - **Explanation:**
   - $\frac{1}{5} = \frac{2}{10} = 0.2$
   - $\frac{1}{25} = \frac{4}{100} = 0.04$
   - $\frac{1}{125} = \frac{8}{1000} = 0.008$
   - Sum = $0.2 + 0.04 + 0.008 = 0.248$.

Section C (3 Scores each)

9. **A)**
   - (i) **Equation:** $2x + \frac{1}{2}x + \frac{1}{4}x + 1 = 100$
   - (ii) **Solution:** $2x + 0.5x + 0.25x = 99$ $2.75x = 99 \Rightarrow \frac{11}{4}x = 99$ $x = 99 \times \frac{4}{11} = 9 \times 4 = 36$ birds.

B)

- (i) **Equation:** $l = 2w$. Perimeter $2(l + w) = 48 \Rightarrow 2(2w + w) = 48 \Rightarrow 6w = 48$.
- (ii) **Dimensions:** $w = 8, l = 16$.
- (iii) **Area:** $16 \times 8 = 128 \text{ m}^2$.

10. **Construction Steps:**
    1. Draw circle with radius 3 cm.
    2. Draw chord of 4 cm.
    3. Draw perpendicular bisector (arcs from both ends of chord).
    4. **Verification:** The bisector line will pass exactly through the center point .
11. **A)**
    - (i) **Area ADC:** Ratio of areas = Ratio of bases. $Area(ABD) : Area(ADC) = 3 : 2$. $\frac{30}{Area(ADC)} = \frac{3}{2} \Rightarrow Area(ADC) = \frac{30 \times 2}{3} = 20 \text{ cm}^2$.
    - (ii) **Ratio to Whole:** $Area(ABC) = 30 + 20 = 50$. Ratio $30 : 50 = 3 : 5$.

    B)
    - Sum of unknown angles = $180 - 80 = 100^\circ$.
    - Ratio $2 : 3$. Parts $2x, 3x$.
    - $5x = 100 \Rightarrow x = 20$.
    - Angles are 40° and 60°.
12. **Answer: 0.2727...**
    - Divide 3 by 11.
    - $30 \div 11 = 2$ (rem 8)
    - $80 \div 11 = 7$ (rem 3) — pattern repeats.
    - Decimal: $0.2727...$ Repeating block: 27.

Section D (4 Scores each)

13. **A)**
    - **Construction:** Draw $\triangle$ with sides 5, 6, 7. Draw perpendicular bisectors of any two sides. Mark circumcenter. Draw circle touching all vertices.

- **Measurement:** Circumradius ≈ 3.5 to 3.6 cm.

B)

- **Construction without measuring:**
  1. Draw PQ.
  2. Draw a ray from P at an angle.
  3. Mark $3 + 4 = 7$ equal arcs on the ray.
  4. Join the last point to Q.
  5. Draw a parallel line from the 3rd mark to intersect PQ at R.
  6. R divides PQ in $3 : 4$.

14. **Answer:**
    - (i) $v = 39.2 - 9.8(2) = 39.2 - 19.6 = 19.6$ m/s.
    - (ii) $0 = 39.2 - 9.8t \Rightarrow 9.8t = 39.2 \Rightarrow t = 4$ seconds.
    - (iii) $v = 39.2 - 9.8(5) = 39.2 - 49 = -9.8$ m/s.
    - **Meaning:** The object is moving downwards .
15. **A)**
    - (i) Construct rhombus (diagonals bisect at 90°).
    - (ii) Diagonals cut into 4 triangles with legs 3 cm and 4 cm. All have included angle 90° and equal legs. By SAS, they are congruent.
    - (iii) Hypotenuse (side of rhombus) = $\sqrt{3^2 + 4^2} = 5$ cm. Perimeter = $4 \times 5 = 20$ cm.

B)

- **Construction:**
  1. Draw a line. Construct 90° and 60° at the same point.
  2. Bisect the angle between 60° and 90° (which is 30°) to get 15°.
  3. $60^\circ + 15^\circ = 75^\circ$.

16. **A)**
    - **Current Mix:** Total 60L. Ratio 2:1. Milk = $\frac{2}{3} \times 60 = 40$L. Water = 20L.

- (i) **New Ratio 1:2:** Milk stays 40L. $40 : W_{new} = 1 : 2 \Rightarrow W_{new} = 80$L. Added Water = $80 - 20 = 60$ Liters.
- (ii) **New Ratio 3:1:** Water stays 20L. $M_{new} : 20 = 3 : 1 \Rightarrow M_{new} = 60$L. Added Milk = $60 - 40 = 20$ Liters.

B)

- (i) Outer length = $5x + 2 + 2 = 5x + 4$.
- (ii) Inner Perimeter $2(5x + 3x) = 160 \Rightarrow 16x = 160 \Rightarrow x = 10$. Inner dimensions: 50m and 30m.
- (iii) Outer dimensions: $50 + 4 = 54$, $30 + 4 = 34$. Outer Perimeter = $2(54 + 34) = 176$. Ratio: $160 : 176 = 10 : 11$.