SECOND TERM SUMMATIVE ASSESSMENT 2026-27

ANSWER KEY / SCORING INDICATORS

MATHEMATICS

Std: X SET 1 **Score: 80**

For teachers **Time: 2½ Hours**

Note to the teacher: Accept any correct method. Give scores for each correct step.

Section A

1. B. 4 (1)

2. C. (5, 0) (1)

3. A. 1/2 (1)

4. B. 110° (∠AOB = 180° − ∠APB) (1)

5. C. 2, 3 (1)

6. A. −5 (1 − 2 + 1 − 5) (1)

7. C. Both statements are true and statement II is the reason for statement I. (1)

8. D. Both statements are true but statement II is not the reason for statement I. (1)

Section B

9. (i) Total = 25; P(red) = 15/25 = 3/5 (1)
(ii) For probability 1/2, blue balls must equal red balls = 15. Number of blue balls to be added = 15 − 10 = 5 (2)

10. (i) 4d = 33 − 17 = 16, d = 4 (1)
(ii) First term = 17 − 4 × 4 = 1; 20th term = 1 + 19 × 4 = 77 (1)
(iii) Sum = 20 × (1 + 77)/2 = 780 (2)

Section C

11. (i) AB = $\sqrt{((7-1)^2 + (10-2)^2)} = \sqrt{(36+64)} = 10$ (2)
(ii) Midpoint = ((1 + 7)/2, (2 + 10)/2) = (4, 6) (1)

12. (i) B(6, 1), D(1, 4) (2)
(ii) Length = 5, breadth = 3; perimeter = 2(5 + 3) = 16 units (1)

13. A. (i) Distance from centre = $\sqrt{((5-2)^2 + (7-3)^2)} = \sqrt{25} = 5$ = radius, so yes. (2)
(ii) Centre is the midpoint: other end = (2 × 2 − 5, 2 × 3 − 7) = (−1, −1) (1)
(iii) (2, 8) and (2, −2) (1)
B. (i) AB = 4, BC = 3, AC = $\sqrt{(16+9)} = 5$ (2)
(ii) Yes; $AB^2 + BC^2 = 16 + 9 = 25 = AC^2$ (AB is horizontal, BC vertical, so ∠B = 90°). (1)
(iii) Area = ½ × 4 × 3 = 6 square units (1)

14. (i) Correct plotting (1)
(ii) Square (all sides 4 units, sides parallel to the axes) (1)
(iii) Area = 16 square units; diagonal = $4\sqrt{2}$ units (2)

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Section D

15. $x^2 + 2x - 15 = (x + 5)(x - 3) = 0$ (or by completing the square: $(x + 1)^2 = 16$) (2)
$x = 3$ or $x = -5$ (1)

16. A. (i) $x + 1/x = 10/3 \Rightarrow 3x^2 - 10x + 3 = 0$ (2)
(ii) $(3x - 1)(x - 3) = 0 \Rightarrow x = 3$ or $x = 1/3$ (2)
B. (i) $x(x + 3) = 54 \Rightarrow x^2 + 3x - 54 = 0$ (2)
(ii) $(x + 9)(x - 6) = 0 \Rightarrow x = 6$; breadth 6 m, length 9 m (2)

17. (i) $p(2) = 8 - 12 + 4 = 0$ (1)
(ii) Yes; $p(2) = 0$, so $x - 2$ is a factor. (1)
(iii) $x^3 - 3x^2 + 4 = (x - 2)(x^2 - x - 2) = (x - 2)(x - 2)(x + 1)$ (2)

18. (i) $x(x - 5) = 84 \Rightarrow x^2 - 5x - 84 = 0$ (2)
(ii) $(x - 12)(x + 7) = 0 \Rightarrow x = 12$ (age cannot be negative) (2)
(iii) 15 years (1)

Section E

19. A. Correct proof using: angle at the centre is double the angle on the circle; the two arcs make 360° at the centre, so $\angle A + \angle C = ½ \times 360° = 180°$ (similarly $\angle B + \angle D = 180°$). (3)
B. $\angle ACB = ½ \times 100° = 50°$; $\angle ADB = 180° - 50° = 130°$ (3)

20. (i) $PA \times PB = PC \times PD \Rightarrow 6 \times 4 = 3 \times PD \Rightarrow PD = 8$ cm (2)
(ii) $CD = 3 + 8 = 11$ cm (1)

21. A. (i) 90°; the tangent is perpendicular to the radius at the point of contact. (1)
(ii) $PT = \sqrt{(13^2 - 5^2)} = \sqrt{144} = 12$ cm (2)
(iii) Area $= ½ \times 5 \times 12 = 30$ cm^2 (1)
B. Half perimeter $s = 15$. Tangent from A $= s - BC = 5$ cm; from B $= s - CA = 3$ cm; from C $= s - AB = 7$ cm (check: $5 + 3 = 8$, $3 + 7 = 10$, $7 + 5 = 12$) (4)

22. (i) Side opposite 30° $= 10 \times \sin 30° = 5$ cm; other side $= 10 \times \cos 30° = 5\sqrt{3}$ cm (2)
(ii) Area $= ½ \times 5 \times 5\sqrt{3} = 25\sqrt{3}/2$ cm^2 (≈ 21.6 cm^2) (2)

23. A. (i) Rough figure (1)
(ii) $\tan 60° = h/20 \Rightarrow h = 20\sqrt{3} \approx 34.6$ m; height of tower $= 34.6 + 1.5 \approx 36.1$ m (3)
B. (i) Rough figure (1)
(ii) $\tan 30° = 30/d \Rightarrow d = 30\sqrt{3} \approx 51.9$ m (3)

24. A. (i) $\angle AOB = 180° - 60° = 120°$ (1)
(ii) In triangle OAP, $\angle APO = 30°$; $\tan 30° = OA/PA \Rightarrow PA = 6\sqrt{3}$ cm (1)
(iii) $OP = 2 \times OA = 12$ cm ($\sin 30° = 6/OP$) (1)
(iv) Area $= 2 \times ½ \times 6 \times 6\sqrt{3} = 36\sqrt{3}$ cm^2 (2)
B. (i) Perpendicular from O bisects AB and $\angle AOB$; half chord $= 8 \sin 60° = 4\sqrt{3}$; $AB = 8\sqrt{3}$ cm (2)
(ii) Distance $= 8 \cos 60° = 4$ cm (1)
(iii) Area $= ½ \times 8\sqrt{3} \times 4 = 16\sqrt{3}$ cm^2 (2)

25. Circle (radius 3 cm) and point P (1)
Circle on OP as diameter / correct construction of tangents (1)
Length of tangent ≈ 6.3 cm ($\sqrt{40}$) (1)

26. Triangle with sides 5, 6, 7 cm (1)

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Bisectors of two angles; incentre (2)
Incircle drawn; radius ≈ 1.6 cm (1)

27. (i) PB = 4 + 5 = 9 cm; $PT^2 = PA \times PB = 36 \Rightarrow PT = 6$ cm (2)

(ii) Rectangle 6 cm × 4 cm; extend the length by 4 cm, draw a semicircle on the 10 cm line as diameter, draw the perpendicular at the joining point to meet the semicircle (length $\sqrt{24}$ cm), and complete the square on it. (3)

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