CBSE · CLASS 10 · MATHEMATICS (BASIC)

CBSE Class 10 Mathematics (Basic) Guess Paper 2027

Time: 3 hours · Maximum marks: 80 · 38 questions

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Section A
20 questions of 1 mark each (18 MCQ + 2 Assertion-Reason)

Q1. The distance between the points (cos30°, sin30°) and (cos60°, −sin60°) is 1 mark
A) 0 unit
B) √3 units
C) 1 unit
D) √2 units

Q2. The class mark of the median class of the following data is : (Class Interval / Frequency) 10–25 : 2, 25–40 : 3, 40–55 : 7, 55–70 : 6, 70–85 : 6, 85–100 : 6. (A) 40 (B) 55 (C) 47.5 (D) 62.5 1 mark

Q3. The mid-point of the line segment joining the points (-1, 3) and (8, 3/2) is : (a) (7/2, -3/4) (b) (7/2, 9/2) (c) (9/2, -3/4) (d) (7/2, 9/4) 1 mark

Q4. The seventh term of an A.P. whose first term is 28 and common difference − 4, is : (a) 0 (b) 4 (c) 52 (d) 56 1 mark

Q5. The value of $(\tan^2 A - 1/\cos^2 A)$ is : (A) more than 1 (B) 1 (C) 0 (D) – 1 1 mark

Q6. The roots of quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ are (A) not real (B) real and equal (C) rational and distinct (D) irrational and distinct 1 mark

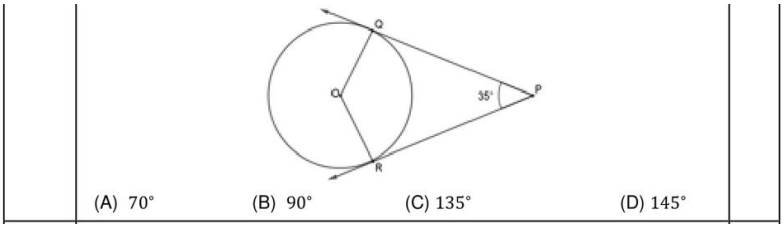
Q7. A quadratic polynomial whose zeroes are 2/5 and −1/5 is (A) $25x^2 + 5x - 2$ (B) $5x^2 - 2x + 1$ (C) $5x^2 + 2x - 1$ (D) $25x^2 - 5x - 2$ 1 mark

Q8. HCF (132, 77) is : (a) 11 (b) 77 (c) 22 (d) 44 1 mark

Q9. $(1 - \tan^2 30°)/(1 + \tan^2 30°)$ is equal to (A) cos 60° (B) sin 60° (C) 1 (D) $\tan^2 60°$ 1 mark

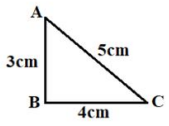
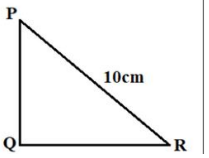
Q10. If the roots of quadratic equation $4x^2 - 5x + k = 0$ are real and equal, then value of k is : (a) 5/4 (b) 25/16 (c) -5/4 (d) -25/16 1 mark

Q11. In the given figure, PQ and PR are tangents to a circle centred at O. If ∠QPR = 35° then ∠QOR is equal to (A) 70° (B) 90° (C) 135° (D) 145° 1 mark

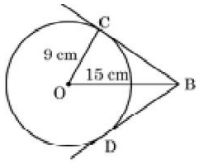


Q12. If ΔABC ~ ΔPQR (with AB = 3 cm, BC = 4 cm, AC = 5 cm and PR = 10 cm as shown), then perimeter of the triangle PQR (in cm) is 1 mark

A) 12
B) 24
C) 18
D) 20

Q10.	If ΔABC~ΔPQR, then perimeter of the triangle PQR (in cm) is A) 12 B) 24 C) 18 D) 20  	1

Q13. In the given figure, BC and BD are tangents to the circle with centre O and radius 9 cm. If OB = 15 cm, then the length (BC + BD) is : (a) 18 cm (b) 12 cm (c) 24 cm (d) 36 cm 1 mark



(a) 18 cm (b) 12 cm
(c) 24 cm (d) 36 cm

(Assertion – Reason based questions)

Directions for Q.19 & Q.20 : In question numbers **19** and **20**, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option :

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

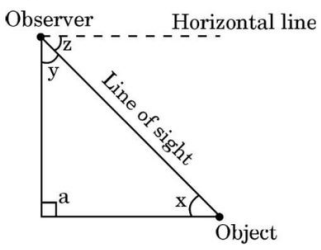
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the

Q14. If the HCF of two positive integers a and b is 1, then their LCM is : (A) a + b (B) a (C) b (D) ab 1 mark

Q15. Which of the following is not the criterion for similarity of triangles ? (A) AAA (B) SSS (C) SAS (D) RHS 1 mark

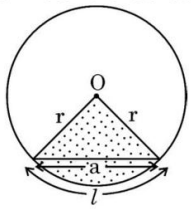
Q16. In the given figure, which of the following angles represents the angle of depression ? [Observer at top with horizontal line; line of sight to Object; marked angles x, y, z at observer/horizontal and a at object] (A) x (B) y (C) z (D) a 1 mark

depression ?



Q17. The perimeter of the shaded region in the given figure is : [Circle with centre O; two radii r bounding a shaded sector, chord a subtending the sector, and arc l] (A) l (B) l + a (C) l + 2r (D) l + 2r + a 1 mark

13. The perimeter of the shaded region in the given figure is :



Q18. The ratio of the area of a quadrant of a circle to the area of the same circle is : (A) 1 : 2 (B) 2 : 1 (C) 1 : 4 (D) 4 : 1 1 mark

Q19. Assertion (A) : The value of p for which the system of equations $4x + py + 8 = 0$ and $2x + 2y + 2 = 0$ is consistent is 4. Reason (R) : The system of equations $a_1x + b_1y = c_1$ and $a_2x + b_2y = c_2$ is consistent with infinitely many solutions, if $a_1/a_2 = b_1/b_2 = c_1/c_2$. (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true. 1 mark

Q20. ASSERTION (A): Two coins are tossed simultaneously. Possible outcomes are two heads, one head and one tail, two tails. Hence, the probability of getting two heads is 1/3.
REASON (R): Probabilities of 'equally likely' outcomes of an experiment are always equal.
A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
B) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
C) Assertion (A) is true but reason (R) is false.
D) Assertion (A) is false but reason (R) is true. 1 mark

Section B
5 Very Short Answer questions of 2 marks each

Q21. Calculate mode of the following distribution: Class: 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 ; Frequency: 5 | 6 | 15 | 10 | 5 | 4. 2 marks

Q22. In an AP, if a = 50, d = -4 and $S_n = 0$, then find the value of n. 2 marks

Q23. Find the values of A and B ($0 \le A < 90°$, $0 \le B < 90°$), if $\tan(A + B) = 1$ and $\tan(A - B) = 1/\sqrt{3}$. 2 marks

Q24. Find the sum of the first twelve 2-digit multiples of 7, using an AP. 2 marks

Q25. A chord of a circle of diameter 20 cm subtends an angle of 60° at the centre of the circle. Find the area of the corresponding minor segment of the circle. (Use π = 3.14 and √3 = 1.73) — 2 marks

Section C
6 Short Answer questions of 3 marks each

Q26. Prove that : $(1 + \cot^2 A)/(1 + \tan^2 A) = ((1 - \cot A)/(1 - \tan A))^2$ — 3 marks

Q27. Find the mean using the step deviation method. Class: 0-10 | 10-20 | 20-30 | 30-40 | 40-50 ; Frequency: 6 | 10 | 15 | 9 | 10. — 3 marks

Q28. Solve the following system of equations graphically : x + 3y = 6; 2x – 3y = 12 — 3 marks

Q29. Prove that √3 is an irrational number. — 3 marks

Q30. Find the ratio in which the y-axis divides the line segment joining the points (4, −5) and (−1, 2). Also find the point of intersection. — 3 marks

Q31. A solid is in the form of a cylinder with hemi-spherical ends of same radii. The total height of the solid is 20 cm and the diameter of the cylinder is 14 cm. Find the surface area of the solid. — 3 marks

Section D
4 Long Answer questions of 5 marks each

Q32. Prove that a line drawn parallel to one side of a triangle intersecting other two sides in distinct points, divides the other two sides in the same ratio. — 5 marks

Q33. As observed from the top of a 75 m high lighthouse from the sea level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. (Use √3 = 1.732) — 5 marks

Q34. A train covers a distance of 300 km at a uniform speed. If the speed of the train is increased by 5 km/hr, it takes 2 hours less in the journey. Find the original speed of the train. — 5 marks

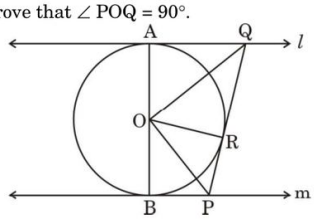
Q35. The difference of the squares of two positive numbers is 180. The square of the smaller number is 8 times the greater number. Find the two numbers. — 5 marks

Section E
3 Case-study based questions of 4 marks each (sub-parts: two 1-mark + one 2-mark; the 2-mark sub-part carries the internal choice)

Q36. A spherical glass vessel has a cylindrical neck 8 cm long and 1 cm in radius. The radius of the spherical part is 9 cm. Find the amount of water (in litres) it can hold, when filled completely. — 4 marks

Q37. In Figure 3, the tangent l is parallel to the tangent m drawn at points A and B respectively to a circle centred at O. PQ is a tangent to the circle at R. Prove that angle POQ = 90 degrees. 4 marks

12. In Figure 3, the tangent l is parallel to the tangent m drawn at points A and B respectively to a circle centred at O. PQ is a tangent to the circle at R. Prove that $\angle POQ = 90°$. *4*



Q38. [Blood Donation Centre 2023 distribution of blood/Rhesus types (in %): O^- = x, O^+ = 30, A^- = 8, A^+ = 24, B^- = 6, B^+ = 18, {AB}^- = 1, {AB}^+ = 3.] Find the value of x. 4 marks

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