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SAMPLE PAPER 04 FOR PERIODIC TEST 02 (2025-26)

(Quadratic Equations, AP, Triangles and Coordinate Geometry)

SUBJECT: MATHEMATICS **MAX. MARKS : 40**

CLASS : X **DURATION : 1½ hrs**

General Instructions:

(i). **All** questions are compulsory.

(ii). This question paper contains 2**0** questions divided into five Sections A, B, C, D and E.

(iii). **Section A** comprises of **10 MCQs** of **1 mark** each. **Section B** comprises of 4 questions of **2 marks** each. **Section C** comprises of 3 questions of **3 marks** each. **Section D** comprises of 1 question of **5 marks** each and **Section E** comprises of 2 Case Study Based Questions of **4 marks** each.

(iv). There is no overall choice.

(v). **Use of Calculators is not permitted**

SECTION – A

Questions 1 to 10 carry 1 mark each.

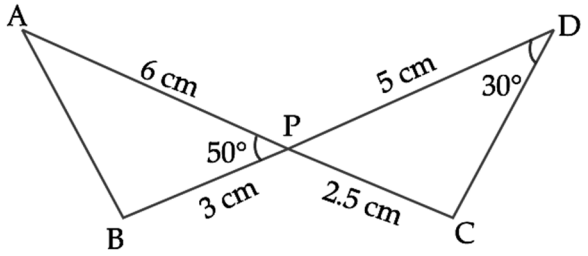
1. The coordinate of point P on X-axis equidistant from the points A (–1, 0) and B (5, 0) is

(a) (2, 0) (b) (0, 2) (c) (3, 0) (d) (2, 2)

2. The value of k for which the equation $x^2 + 2(k + 1)x + k^2 = 0$ has equal roots is

(a) – 1 (b) $-\frac{1}{2}$ (c) 1 (d) none of these

3. In the figure given below, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, ∠APB = 50° and ∠CDP = 30°. Then, ∠PBA is equal to:



(a) 50° (b) 30° (c) 60° (d) 100°

4. Which of the following equations has two distinct real roots?

(a) $2x^2 - 3\sqrt{2}x + \frac{9}{4} = 0$ (b) $x^2 + x - 5 = 0$

(c) $x^2 + 3x + 2\sqrt{2} = 0$ (d) $5x^2 - 3x + 1 = 0$

5. The 21st term of the AP whose first two terms are –3 and 4 is

(a) 17 (b) 137 (c) 143 (d) –143

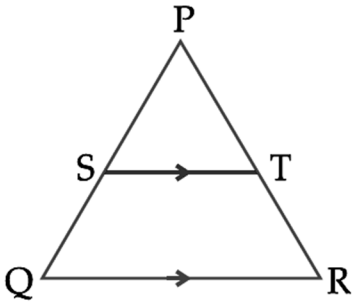
6. If (a, b) is the mid point of the line segment joining the points A (10, –6) and B (k, 4) and a – 2b = 18, the values of k is

(a) 30 (b) 22 (c) 4 (d) 40

7. The common difference of an A.P., whose *n*th term is $a_n = (3n + 7)$, is:

(a) 3 (b) 7 (c) 10 (d) 6

8. In the following figure, ST || QR, point S divides PQ in the ratio 4 : 5. If ST = 1.6 cm, what is the length of QR?



(a) 0.71 cm (b) 2 cm (c) 3.6 cm (d) cannot be calculated from the given data.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(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.

9. Assertion (A): The roots of the quadratic equation $x^2 + 2x + 2 = 0$ are imaginary
Reason (R): If discriminant $D = b^2 - 4ac < 0$ then the roots of quadratic equation $ax^2 + bx + c = 0$ are imaginary.

10. Assertion (A): If the second term of an A.P., is 13 and the fifth term is 25, then its 7th term is 33.
Reason (R): If the common difference of an A.P. is 5, then $a_{18} - a_{13}$ is 25.

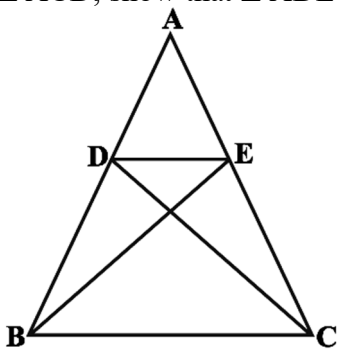
SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the values of y for which the distance between the points P(2, – 3) and Q(10, y) is 10 units.

12. Find the values of k for which quadratic equations $kx\,(x - 2) + 6 = 0$ has two equal roots.

13. In the below figure, if Δ ABE ≅ Δ ACD, show that Δ ADE ~ Δ ABC.



14. Find the roots of the equation $5x^2 - 3x - 2 = 0$

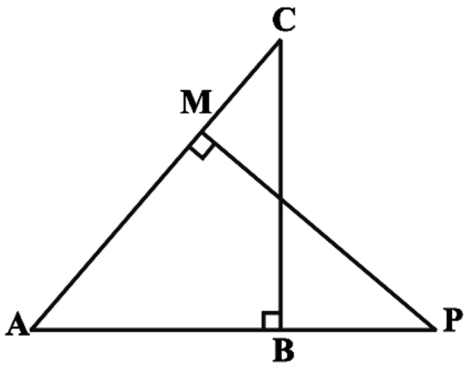
SECTION – C

Questions 15 to 17 carry 3 marks each.

15. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

16. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.

17. In the below figure, ABC and AMP are two right triangles, right angled at B and M respectively. Prove that: (i) Δ ABC ~ Δ AMP (ii) CA/PA = BC/MP



SECTION – D

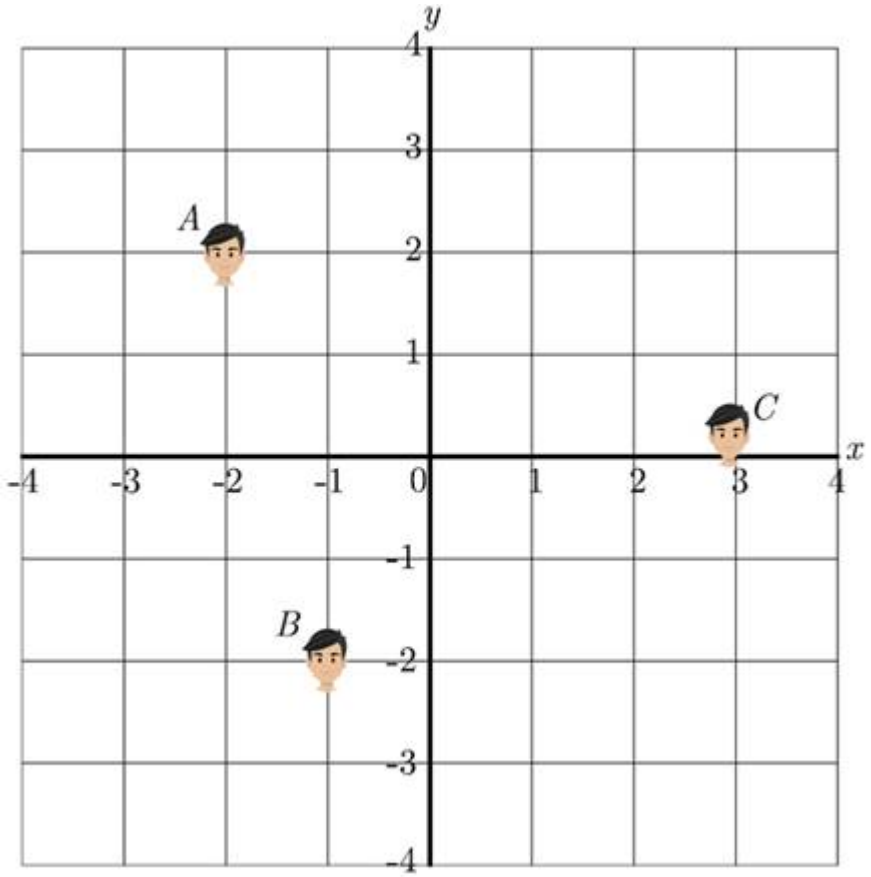
Questions 18 carry 5 marks.

18. Prove that "If a line is drawn parallel to one side of a triangle, the other two sides are divided in the same ratio."

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Aditya, Ritesh and Damodar are fast friend since childhood. They always want to sit in a row in the classroom . But teacher doesn't allow them and rotate the seats row-wise everyday. Ritesh is very good in maths and he does distance calculation everyday. He consider the centre of class as origin and marks their position on a paper in a co-ordinate system. One day Ritesh make the following diagram of their seating position marked Aditya as A, Ritesh as B and Damodar as C.



(i) What is the distance between A and B ? [1]
(ii) What is the distance between B and C ? [1]
(iii) A point D lies on the line segment between points A and B such that AD :DB = 4 : 3 . What are the the coordinates of point D ? [2]

OR

(iii) If the point P(k, 0) divides the line segment joining the points A(2, –2) and B(–7, 4) in the ratio 1 : 2, then find the value of k [2]

20. A school auditorium has to be constructed with a capacity of 2000 people. The chairs in the auditorium are arranged in a concave shape facing towards the stage in such a way that each succeeding row has 5 seats more than the previous one.

(a) If the first row has 15 seats, then how many seats will be there in 12th row?

(b) If there are 15 rows in the auditorium, then how many seats will be there in the middle row?

(c) If total 1875 guests were there in the auditorium for a particular event, then how many rows will be needed to make all of them sit?

OR

(c) If total 1250 guests were there in the auditorium for a particular event, then how many rows will be left blank out of total 30 rows?