

ESSENCE TEST-10

DATE : 01-09-19

10TH CLASS

MP BOARD

QUADRATIC EQUATION, CO-ORNATE GEOMETRY,
ARITHMETIC PROGRESSION, LINEAR EQUATIONS

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MARKS : 80**MATHEMATICS****TIME : 3 HR.****SECTION-A**

1. If the distance between the points $(p, 4)$ and $(0, 1)$ is 5, then the value of p is **[1]**
(a) 4 only (b) ± 4 (c) -4 only (d) 0
2. Aruna has only Rs. 1 and Rs. 2 coins with her. If the total number of coins that she has is 50 and the amount of money with her is Rs. 75, then the number Rs. 1 and Rs. 2 coins are respectively. **[1]**
(a) 35 and 15 (b) 25 and 25 (c) 15 and 35 (d) 30 and 25
3. A fast train takes 2 hours less for a journey of 300 km in comparison to a slow train whose speed is 5 km/h less than that of the fast train. The speed of the fast train is equal to **[1]**
(a) 25 km/h (b) 30 km/h (c) 40 km/h (d) 45 km/h
4. If the n th term of a sequence is $3 + 2n$, then the sum of its first 20 terms is **[1]**
(a) 480 (b) 520 (c) 500 (d) 460

SECTION – (B)

5. Find the solution of the pair of linear equation $37x + 43y = 123$, $43x + 37y = 117$. **[2]**
6. Solve for x : $p^2 x^2 + (p^2 - q^2)x - q^2 = 0$, $p \neq 0$. **[2]**
7. Find the sum of first 25 terms of an AP whose n th term is $1 - 4n$. **[2]**

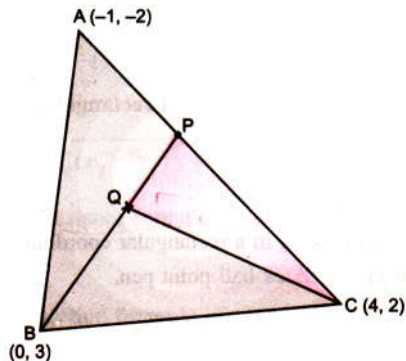
SECTION – (C)

8. If P (x, y) is any point on the line joining the points A (a, 0) and B (0, b), then show that $\frac{x}{a} + \frac{y}{b} = 1$. [3]
9. Show that the points A (5, 6), B (1, 5), C (2, 1) and D (6, 2) are the vertices of a square. [3]
10. The point R divides the line segment AB such that $AR = \frac{3}{4} AB$. Find the coordinates of R if the points A and B are respectively (-4, 0) and (0, 6). [3]
11. Use factorization method to find the roots of the quadratic equation $\sqrt{35} x^2 - \left(\frac{5}{\sqrt{7}} + \frac{7}{\sqrt{5}}\right)x + 1 = 0$ [3]
12. Sham was late by 5 minutes in joining his duty on the first working day. On the second day, he was late by 10 minutes, on third day by 15 minutes and so on. After 25 working days he was shunted out of the job.
- (i) Find the total working time avoided by Sham.
- (ii) Was the management justified in dismissing Sham? [3]
13. A motor boat whose speed is 18 km/hour in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. [3]
14. Solve the following system of equations $\frac{bx}{a} - \frac{ay}{b} + a + b = 0$, $bx - ay + 2ab = 0$ [3]

15. A two-digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number. [3]
16. Find the value(s) of k for which the pair of linear equation $kx + 3y = k - 2$ and $12x + ky = k$ has no solution. [3]
17. If 9th term of an AP is 37 and 17th term is 47, find the sum of first 29 terms of the AP. [3]

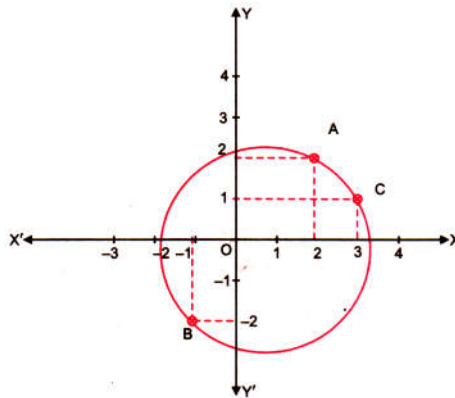
SECTION – (D)

18. In figure, P divides AC in the ratio 1 : 2 and Q divides BP in the ratio 3 : 1. Find the area of the $\triangle BQC$ and the area of the $\triangle PQC$. [4]



19. A passenger train takes $1\frac{2}{3}$ hours less for a journey of 400 km if its speed is increased by 8 km/hour from its original speed. Find the original speed of the train. [4]

20. In figure, find the coordinates of the centre of the circle which is drawn through the points A, B and C. Also find the radius. [4]



21. The difference of two positive integers is 4 and the numerical difference of their reciprocals is $\frac{1}{24}$. Find the integers. [4]
22. Two points A and B on a highway are at a distance of 240 km from each other. The car which starts from A moves with constant speed along the direction AB and the second car moves from B at the same time with a constant speed in the same direction. The first car overtakes the second in 4 hours. However, if the second car moves from B towards A, the two cars meet each other after two hours. Find the speed of the car which starts from B. [4]

22. Solve for x and y: $\frac{2}{2x+y} - \frac{1}{x-2y} + \frac{5}{9} = 0$, $\frac{9}{2x+y} - \frac{6}{x-2y} + 4 = 0$

23. If the m^{th} term of an AP is $\frac{1}{n}$ and the n^{th} term is $\frac{1}{m}$, then show that the $(mn)^{\text{th}}$ term of the AP is 1. ($m \neq n$). [4]
24. The sum of three natural numbers in AP is 15, the common difference of the AP is also a natural number and the product of the numbers is 105. Find the numbers. [4]
25. If the sum of first m terms of an AP is equal to sum of first n terms, then show that the sum of the first $m + n$ terms of the AP is zero.
26. The ratio of the sums to n terms of two AP's is $(7n + 1):(4n + 27)$. Find the ratio of their 9th terms. [4]



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