Jan 7 S2 16-30

EE24BTECH11051 - Prajwal

1) Let α and β are the roots of the equation $x^2 - x - 1 = 0$. If $p_k = (\alpha)k + (\beta)k, k \geq 1$ then which one of the following statements is not true?

   a) $(p_1 + p_2 + p_3 + p_4 + p_5) = 26$
   b) $p_5 = 11$
   c) $p_5 = p_2 * p_3$
   d) $p_3 = p_5 - p_4$

2) The area of the region $\{(x, y) \in R | 4x^2 \leq y \leq 8x + 12\}$ is :

   a) $\frac{125}{3}$
   b) $\frac{128}{3}$
   c) $\frac{124}{3}$
   d) $\frac{127}{3}$

3) The value of c in Lagrange's mean value theorem for the function $f(x) = x^3 - 4x^2 + 8x + 11$, where $x \in [0, 1]$ is

   a) $\frac{(4-\sqrt{7})}{3}$
   b) $\frac{2}{3}$
   c) $\frac{(\sqrt{7}-2)}{3}$
   d) $\frac{(4-\sqrt{5})}{3}$

4) Let $y = y(x)$ be a function of x satisfying $y\left(\sqrt{1-x^2}\right) = k - x\left(\sqrt{1-y^2}\right)$ where k is a constant and $y(1/2) = -1/4$. Then $\frac{dy}{dx}$ at $x = \frac{1}{2}$ is equal to:

   a) $\frac{-\sqrt{5}}{2}$
   b) $\frac{\sqrt{5}}{2}$
   c) $\frac{-\sqrt{5}}{4}$
   d) $\frac{2}{\sqrt{5}}$

5) Let the tangents drawn from the origin to the circle, $x^2 + y^2 - 8x - 4y + 16 = 0$ touch it at the points A and B. The $(AB)^2$ is equal to

   a) $\frac{32}{5}$
   b) $\frac{64}{5}$
   c) $\frac{52}{5}$
   d) $\frac{56}{5}$

6) If system of linear equations

$$x + y + z = 6$$
$$x + 2y + 3z = 10$$
$$3x + 2y + \lambda z = \mu$$

   has more than two solutions, then $\mu - \lambda^2$ is equal to

7) If the function f defined on $\left(\frac{-1}{3}, \frac{1}{3}\right)$ by $f(x) = \begin{cases} \left(\frac{1}{x}\right)\log\left(\frac{1+3x}{1-2x}\right) & \text{if} x \neq 0 \\ k & \text{if } x = 0 \end{cases}$ is continuous, then k is equal to

8) If the foot of perpendicular drawn from the point $(1, 0, 3)$ on a line passing through $(\alpha, 7, 1)$ is $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$ then α is equal to:

9) If the mean and variance of eight numbers $3, 7, 9, 12, 13, 20, x$ and y be 10 and 25 respectively then xy is equal to

10) Let $X = \{n \in N : 1 \leq n \leq 50\}$. If $A = \{n \in N : n \text{ is a multiple of } 2\}$ and $B = \{n \in N : n \text{ is a multiple of } 7\}$, then the number of elements in the smallest subset of X containing both A and B is .