jee-main-maths-25-06-2022-shift-2

EE24BTECH11030 - J.KEDARANANDA

1) A biased die is marked with numbers 2, 4, 8, 16, 32, 32 on its faces and the probability of getting a face with mark n is $\frac{1}{n}$. If the die is thrown thrice, then the probability, that the sum of the numbers obtained is 48, is :

a) $\frac{7}{2^{11}}$ b) $\frac{7}{2^{12}}$ c) $\frac{3}{2^{10}}$ d) $\frac{13}{2^{12}}$

2) The negation of the Boolean expression $((\sim q) \wedge p) \implies ((\sim p) \vee q)$ is logically equivalent to :

a) $p \implies q$ b) $q \implies p$ c) $\sim (p \implies q)$ d) $\sim (q \implies p)$

3) If the line $y = 4 + kx$, k > 0, is the tangent to the parabola $y = x - x^2$ at the point **P** and **V** is the vertex of the parabola, then the slope of the line through **P** and **V** is :

a) $\frac{3}{2}$ b) $\frac{26}{9}$ c) $\frac{5}{2}$ d) $\frac{23}{6}$

4) The value of $tan^{-1}\left(\frac{\cos\frac{15\pi}{4}-1}{\sin\frac{\pi}{4}}\right)$ is equal to:

a) $\frac{-\pi}{4}$ b) $\frac{-\pi}{8}$ c) $\frac{-5\pi}{12}$ d) $\frac{-4\pi}{9}$

5) The line $y = x + 1$ meets the ellipse $\frac{x^2}{4} + \frac{y^2}{2} = 1$ at two points **P** and **Q**. If r is the radius of the circle with PQ as diameter then $(3r)^2$ is equal to :

a) 20 b) 12 c) 11 d) 8