2023-Jan-30 Shift-2

AI24BTECH11002 - K. Akshay Teja

The statement "If I have fever, then I will take medicine and I will take rest" is equivalent to:

2) Let A be a point on the x-axis. Common tangents are drawn from A to the curves $x^2 + y^2 = 8$ and $y^2 = 16x$. If one of these tangents touches the two curves at Q and R, then $(QR)^2$ is equal to

3) Let q be the maximum integral value of p in [0, 10] for which the roots of the equation $x^2 - px + \frac{5}{4}p = 0$ are rational. Then the area of the region $(x, y) : 0 \le y \le (x - q)^2$, $0 \le x \le q$ is

4) If the functions $f(x) = \frac{x^3}{3} + 2bx + a\frac{x^2}{2}$ and $g(x) = \frac{x^3}{3} + ax + bx^2$, $a \ne 2b$, have a common extreme

c) 81

c) $\frac{125}{2}$

c) 3

c) $(P \vee Q) \wedge ((-P) \vee R)$

d) $(P \vee -Q) \wedge (P \vee -R)$

d) 72

d) 164

d) 6

1) Consider the following statements:

O: I will not take medicine

a) $((-P) \vee -O) \wedge ((-P) \vee R)$

b) $((-P) \vee -O) \wedge ((-P) \vee -R)$

point, then a + 2b + 7 is equal to

b) 76

b) 25

b) $\frac{3}{2}$

5) The range of the function $f(x) = \sqrt{3-x} + \sqrt{2+x}$ is

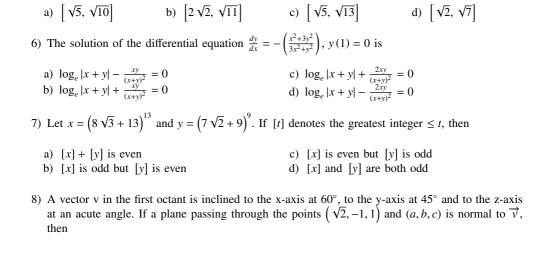
P: I have fever

a) 64

a) 243

a) 4

R: I will take rest



a) $\sqrt{2}a + b + c = b$ b) $a + b + \sqrt{2}c = c$		c) $a + \sqrt{2}b + 6$ d) $\sqrt{2}a - b + 6$		
	e the real valued function $x \neq -1$ and $h(x) = x = -1$ $g(h(x-1))$ is		$x(t) = \begin{pmatrix} \frac{x}{ x }, & x \neq 0 \\ 1, & x = 0 \end{pmatrix}$ I is the greatest integer ≤ 1 .	x. The
a) 1	b) sin(1)	c) -1	d) 0	
	ways of selecting two n such that 2 is the remaind		re $a \in \{2, 4, 6, \dots, 100\}$ and led by 23 is	$b \in$
a) 186	b) 54	c) 108	d) 268	

11) If P is a 3×3 real matrix such that $P^T = aP + (a-1)I$, where a > 1, then

- c) $\begin{vmatrix} Adj P \\ Adj P \end{vmatrix} = 1$ a) P is a singular matrix b) |Adj P| > 1
- 12) Let $\lambda \in \mathbb{R}, \overrightarrow{d} = \lambda \hat{i} + 2\hat{j} 3\hat{k}, \overrightarrow{b} = \hat{i} \lambda \hat{j} + 2\hat{k}$. If $(\overrightarrow{d} + \overrightarrow{b}) \times (\overrightarrow{d} \times \overrightarrow{b}) = 8\hat{i} 40\hat{j} 24\hat{k}$, then $\left|\lambda\left(\overrightarrow{a}+\overrightarrow{b}\right)\times\left(\overrightarrow{a}-\overrightarrow{b}\right)\right|^2$ is equal to
 - a) 140
- b) 132

c) 144

d) 136

13) Let \overrightarrow{a} and \overrightarrow{b} be two vectors. Let $|\overrightarrow{a}| = 1$, $|\overrightarrow{b}| = 4$ and $|\overrightarrow{a}| = 1$. If $|\overrightarrow{c}| = 2\overrightarrow{a} - 3\overrightarrow{b}$, then the value of $\overrightarrow{b} \cdot \overrightarrow{c}$ is

a) -24

b) -48

c) -84

d) -60

 $\tan^{-1}\left(\frac{1}{1+a_{2021}a_{2022}}\right)$ is equal to

- a) $\frac{\pi}{4} \cot^{-1}(2022)$ b) $\cot^{-1}(2022) \frac{\pi}{4}$ c) $\tan^{-1}(2022) \frac{\pi}{4}$ d) $\frac{\pi}{4} \tan^{-1}(2022)$

15) The parabolas: $ax^2 + 2bx + cy = 0$ and $dx^2 + 2ex + fy = 0$ intersect on the line y = 1. If a, b, c, d, e, fare positive real numbers and a, b, c are in G.P., then

- a) d, e, f are in A.P. b) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in G.P. c) $\frac{d}{a}, \frac{e}{b}, \frac{f}{c}$ are in A.P. d) d, e, f are in G.P.