2021-February
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AI24BTECH11031 - Shivram S

1) The area bounded by the lines $y = |x - 1| - 2$ is _____. [Feb 2021]
2) The number of integral values of k for which the equation $3\sin x + 4\cos x = k + 1$ has a solution, $k \in \mathbb{R}$ is _____. [Feb 2021]
3) Let $m, n \in \mathbb{N}$ and $\gcd(2, n) = 1$. If $30\binom{30}{0} + 29\binom{30}{1} + \cdots + 2\binom{30}{28} + 1\binom{30}{29} = n \cdot 2^m$, then $n + m =$ _____. [Feb 2021]
4) If $y = y(x)$ is the solution of the equation $e^{\sin y}\cos y\frac{dy}{dx} + e^{\sin y}\cos x = \cos x$, $y(0) = 0$; then $1 + y\left(\frac{\pi}{6}\right) + \frac{\sqrt{3}}{2}y\left(\frac{\pi}{3}\right) + \frac{1}{\sqrt{2}}y\left(\frac{\pi}{4}\right)$ is equal to _____. [Feb 2021]
5) The number of solutions of the equation $\log_4(x - 1) = \log_2(x - 3)$ is _____. [Feb 2021]
6) If $\sqrt{3}(\cos^2 x) = (\sqrt{3} - 1)\cos x + 1$, the number of solutions of the given equation when $x \in \left[0, \frac{\pi}{2}\right]$ is _____. [Feb 2021]
7) Let $(\lambda, 2, 1)$ be a point on the plane which passes through the point $(4, -2, 2)$. If the plane is perpendicular to the line joining the points $(-2, -21, 29)$ and $(-1, -16, 23)$, then $\left(\frac{\lambda}{11}\right)^2 - \frac{4\lambda}{11} - 4$ is equal to _____. [Feb 2021]
8) The difference between degree and order of a differential equation that represents the family of curves given by $y^2 = a\left(x + \frac{\sqrt{a}}{2}\right)$, $a > 0$ is _____. [Feb 2021]
9) The sum of 162^{th} power of the roots of the equation $x^3 - 2x^2 + 2x - 1 = 0$ is _____. [Feb 2021]
10) The value of the integral $\int_0^{\pi} |\sin 2x|\, dx$ is _____. [Feb 2021]