JEE MAINS 2024
April 8 - Shift 1

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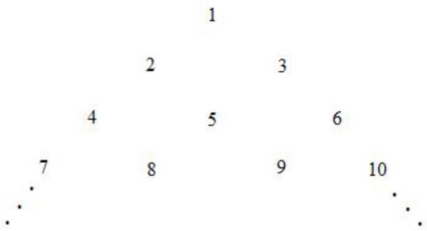
Integer Type

1) Let the area of the region enclosed by the curve $y = min\{\sin x, \cos x\}$ and the x-axis between $x = -\pi$ and $x = \pi$ be A. Then A^2 is equal to
2) The number of 3-digit numbers, formed using the digits 2, 3, 4, 5 and 7, when the repetition of digits is not allowed, and which are not divisible by 3, is equal to
3) Let $\mathbf{a} = 9i - 13j + 25k$, $\mathbf{b} = 3i + 7j - 13k$ and $\mathbf{c} = 17i - 2j + k$ be three given vectors. If $\mathbf{r}$ is a vector such that $\mathbf{r} \times \mathbf{a} = (\mathbf{b} + \mathbf{c}) \times \mathbf{a}$ and $\mathbf{r} \cdot (\mathbf{b} - \mathbf{c}) = 0$, then $\frac{|593\mathbf{r}+67\mathbf{a}|^2}{(593)^2}$ is equal to
4) If the range of $f(\theta) = \frac{\sin^4\theta+3\cos^2\theta}{\sin^4\theta+\cos^2\theta}$, $\theta \in \mathbb{R}$ is $[\alpha, \beta]$, then the sum of the infinite G.P., whose first term is 64 and the common ratio is $\frac{\alpha}{\beta}$, is equal to
5) Let $A = \begin{pmatrix} 2 & -1 \\ 1 & 1 \end{pmatrix}$. If the sum of diagonal elements of A^{13} is 3^n, then n is equal to
6) Let $\alpha = \sum_{r=0}^{n} \left(4r^2 + 2r + 1\right)^n C_r$ and $\beta = \left(\sum_{r=0}^{n} \frac{^nC_r}{r+1}\right) + \frac{1}{n+1}$. If $140 < \frac{22\alpha}{\beta} < 281$, then the value of n is
7) The value of $\lim_{x\to 0} 2\left(\frac{1-\cos x\sqrt{\cos 2x}\sqrt[3]{\cos 3x}.....\sqrt[10]{\cos 10x}}{x^2}\right)$ is
8) Three balls are drawn at random from a bag containing 5 blue and 4 yellow balls. Let the random variables X and Y respectively denote the number of blue and yellow balls. If $\overline{X}$ and $\overline{Y}$ are the means of X and Y respectively, then $7\overline{X} + 4\overline{Y}$ is equal to
9) If the orthocentre of the triangle formed by the lines $2x + 3y - 1 = 0$, $x + 2y - 1 = 0$ and $ax + by - 1 = 0$, is the centroid of another triangle, whose circumcentre and orthocentre respectively are $(3, 4)$ and $(-6, -8)$, then the value of $|a - b|$ is
10) Let the positive integers be written in the form:



If the k^{th} row contains exactly k numbers for every natural number k, then the row in which the number 5310 will be, is