

JEE Main 26<sup>th</sup> Feb Shift 1 Mathematics Memory-Based Questions – by Mathematically Inclined  
YouTube Channel

JEE MAIN 2021 : JARY SHIFT - I

WORK  
4 U!

Q.  $30 {}^{30}C_0 + 29 {}^{30}C_1 + \dots + 1 {}^{30}C_{29}$ ,  $m, n \in \mathbb{N}$   
&  $\gcd(2, n) = m2^n$  then  $m + n =$  —

Diff w/ A x

$30(x+1)^{29}$   
 $= 30x^{29} + 30 \times 29x^{28}$   
 $+ {}^{30}C_2 \cdot 28x^{27} + \dots + {}^{30}C_{29}$   
 $m = 30$   
 $n = 29$

A  $(x+1)^{30}$   
 $= {}^{30}C_0 x^{30} + {}^{30}C_1 x^{29}$   
 $+ {}^{30}C_2 x^{28} + \dots + {}^{30}C_{30}$

B  
C  
D

Q. Find value of determinant A =

$$\begin{vmatrix} (a+1)(a+2) & (a+2) & 1 \\ (a+2)(a+3) & (a+3) & 1 \\ (a+3)(a+4) & (a+4) & 1 \end{vmatrix}$$

A 0  
B  $(a+1)(a+2)(a+3)$   
C 1  
D  $(a+2)(a+3)(a+4)$

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Q. A fair coin is tossed fixed times. The probability of getting 7 heads = Probability of getting 9 heads... Then find probability of getting 2 heads  $P(2H) = ?$

$n = 16$

$P(2H) = {}^{16}C_2 \left(\frac{1}{2}\right)^{16}$

$P(7H) = P(9H)$

$p = q = \frac{1}{2}, n$

~~${}^nC_7 \left(\frac{1}{2}\right)^7 \left(\frac{1}{2}\right)^{n-7} = {}^nC_9 \left(\frac{1}{2}\right)^9 \left(\frac{1}{2}\right)^{n-9}$~~

$\vec{a} \cdot \vec{b} = 0$

Q. If  $\vec{a}$  and  $\vec{b}$  are perpendicular, then

Prove!  $\vec{a} \times (\vec{a} \times (\vec{a} \times (\vec{a} \times \vec{b})))$

~~$(\vec{a} \cdot \vec{b})\vec{a} - (\vec{a} \cdot \vec{a})\vec{b}$~~

$\vec{a} \times (\vec{a} \times (-|\vec{a}|^2 \vec{b}))$

$\vec{a} \cdot (-|\vec{a}|^2 \vec{b})\vec{a} - |\vec{a}|^2 (-|\vec{a}|^2 \vec{b})$

Q.  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos^2 x}{1+3^x} dx = I - \textcircled{1}$

$\downarrow x - \textcircled{2}$

A  $\checkmark \frac{\pi}{4}$   $\frac{1}{2} \int_0^{\pi/2} (1 + \cos 2x) dx$

B  $2\pi$   $= \frac{1}{2} \left( x + \frac{\sin 2x}{2} \right)$

C  $\frac{\pi}{2}$   $= \frac{1}{2} \left( \frac{\pi}{2} + \dots \right)$

D  $4\pi$

Q. Integral: from  $-\pi/2$  to  $\pi/2$  mod  $\sin 2x$

$\textcircled{0 \text{ to } \pi}$

$\frac{1}{2} \int_{-\pi}^{\pi} |\sin t| dt$

$= \frac{1}{2} \times 2 \int_0^{\pi} |\sin t| dt$

$= \int_0^{\pi} \sin t dt$

$\int_{-\pi/2}^{\pi/2} |\sin(2x)| dx$

$2x = t$

$\Rightarrow dx = \frac{1}{2} dt$

$x > 3$

Find no. of solutions  $\log_2(x-3) = \log_4(x-1)$

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$x-3 = \log_4(x-1)$   
 $\frac{1}{2} \log_2(x-1)$  A  
 $x-1$  B  
 $x = x-1$  C

$(x-5)(x-2) = 0$   
 $x = 5$  ✓  
 no. = 1 ✓

More Questions will be Added Soon

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