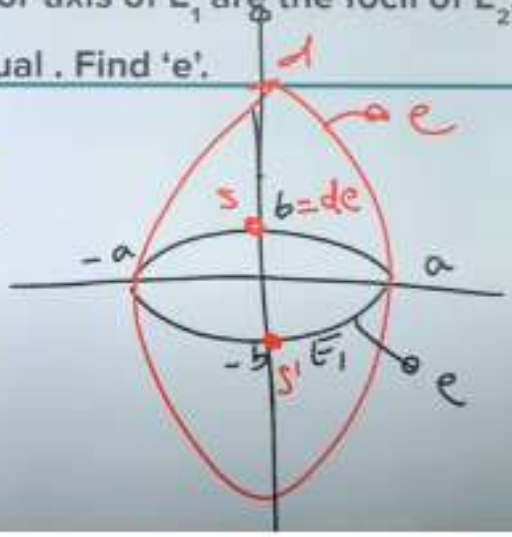
If $E_1 : \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1; a > b$, E_2 is an ellipse which touches E_1 at the ends of major axis of E_1 & end of minor axis of E_1 are the focii of E_2. The eccentricity of both ellipse are equal . Find 'e'.

$e^2 = 1 - \frac{b^2}{a^2}$

$\frac{x^2}{a^2} + \frac{y^2}{d^2} = 1$, $d^2 = b^2/e^2$

$e^2 = 1 - \frac{a^2}{b^2/e^2}$

$e^2 = 1 - \frac{a^2 e^2}{b^2}$



4 die rolled, numbers are filled in 2 × 2 matrices. Find the probability that the matrices is nonsingular & all entries are different.

b, d

a, b, c, d distinct

$|A| = ad - bc = 0$

$\frac{16}{6^4}$

1, 2, 3, 4, 5, 6

1 × 6 2 × 3 → 8

2 × 6 3 × 4 → 8

$A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, number of matrices 'B' which can be formed such that

AB = BA; B can have elements (1, 2, 3, 4, 5)

$= \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$

$AB = BA$

$\begin{bmatrix} d & e & f \\ a & b & c \\ g & h & i \end{bmatrix} = \begin{bmatrix} b & a & c \\ e & d & f \\ h & g & i \end{bmatrix}$

$b = d = x_1 \quad i = x_5$

$e = a = x_2$

$f = c = x_3$

$g = h = x_4$

$B = \begin{bmatrix} x_2 & x_1 & x_3 \\ x_1 & x_2 & x_3 \\ x_4 & x_4 & x_5 \end{bmatrix}$

0, 2 ,4, 6, 8 number of numbers > 10000 which can be formed, if repetition not allowed.

$A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, number of matrices 'B' which can be formed such that

AB = BA; B can have elements (1, 2, 3, 4, 5)

$11^n > 10^n + 9^n$ number of integers satisfy the relation in {1, 2, 3,.....,100}

$11^n - 9^n > 10^n$

$n = 5, 6, \ldots, 100$

$(10+1)^n - (10-1)^n > 10^n$

$2\left({}^nC_1 10^{n-1} + {}^nC_3 10^{n-3} + \ldots\right) > 10^n$

${}^nC_1 10^{n-1} = n \times 10^{n-1}$

$n = 4 \Rightarrow 2\left(4 \times 10^3 + 4 \times 10\right)$

10^4

If the domain $f(x) = \frac{\cos^{-1}\sqrt{x^2 - x + 1}}{\sqrt{\sin^{-1}\left(\frac{2x-1}{2}\right)}}$ is the integral (α, β) then α + β is

Answer B

A $\frac{1}{2}$

B $\frac{3}{2}$

C 1

D 2

Let s_n denote sum of first n - terms of an ap, $s_{10} = 530$, $s_5 = 140$ then $s_{20} - s_6$

Answer D

A 1872

B 1842

C 1852

D 1862

The number of solution of $\sin^7 x + \cos^7 x = 1,\ x \in (0, 4\pi]$

Answer D

A 7

B 11

C 9

D 5