

G1 (1/1 point)

Using 5 numbers 1, 2, 3, 4, 5 to fill in 1x6 grids, each grid is filled with one digit. If there are odd number of grids that have 1 written on them, and an even number of grids with 2, then how many arrangements there for 1*6 grids?

3906

3906

Answer: 3906**EXPLANATION**

$$G(x)$$

$$= \left(1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \dots\right) \left(\frac{x}{1!} + \frac{x^3}{3!} + \dots\right) \left(1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots\right)^3$$

$$= \left(\frac{e^x + e^{-x}}{2}\right) \left(\frac{e^x - e^{-x}}{2}\right) (e^x)^3$$

$$= \frac{e^{5x} - e^x}{4} = \frac{1}{4} \sum_{n=0}^{\infty} (5^n - 1^n) \frac{x^n}{n!}$$

$$B_6 = \frac{5^6 - 1}{4} = 3906$$

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