

Lista de exercícios

1. a) $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24 //$

b) $5! - 6!$

$$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$$

$$6! = 6 \cdot 5! \Rightarrow 6 \cdot 120 \Rightarrow 720$$

$$5! - 6! = 120 - 720 = -600 //$$

c) $9!/6!$

$$9! = 9 \cdot 8 \cdot 7 \cdot 6! = 9 \cdot 8 \cdot 7 \cdot 720 = 362880$$

$$9!/6!$$

$$362880 / 720 = 504 //$$

d) $98!/100!$

$$100! = 100 \cdot 99 \cdot 98!$$

$$98! / 100 \cdot 99 \cdot 98!$$

$$1 / 9900 //$$

2. $\frac{1}{n!} - \frac{n}{(n+1)!} \rightarrow \frac{1}{n!} - \frac{n}{n!(n+1)}$

$$\frac{(n+1) \cdot 1 - n}{(n+1) \cdot n!} = \frac{n+1-n}{n!(n+1)}$$

$$\frac{n+1-n}{n!(n+1)} \rightarrow \frac{1}{(n+1)!} //$$

alternativa (A) //

3. $\frac{(n!)^2 - (n-1)! \cdot n!}{(n-1)! \cdot n!}$

$$\frac{n! \cdot n! - (n-1)! \cdot n!}{(n-1)! \cdot n!}$$

$$\frac{n! - (n-1)!}{(n-1)!}$$

$$\frac{n \cdot (n-1)! - n(n-1)!}{(n-1)!}$$

$$\frac{n-1}{1} = n-1 //$$

alternativa (A) //

4. $\frac{(n+2)! (n-2)!}{(n+1)! (n-1)!} = 4$

$$\frac{(n+2) \cdot (n+1)! \cdot (n-2)!}{(n+1)! (n-1) \cdot (n-2)!} = 4$$

$$\frac{n+2}{n-1} = 4$$

$$n+2 = 4 \cdot (n-1)$$

$$n+2 = 4n - 4$$

$$2 + 4 = 4n - n$$

$$6 = 3n$$

$$n = 6/3$$

alternativa (A) // $n = 2 //$

5. $\frac{(n+1)! - n!}{(n+1)!} = \frac{7}{n+1}$

$$\frac{(n+1) \cdot n! - n!}{(n+1) \cdot n!} = \frac{7}{n+1}$$

$$\frac{(n+1-1) \cdot n!}{(n+1) \cdot n!} = \frac{7}{n+1}$$

$$\frac{n}{(n+1)} = \frac{7}{n+1}$$

$$n = 7 //$$

alternativa (D) //

6. $n \in \mathbb{N}, n \geq 1$

$$[(n+1)! - n!]$$

$$(n-1)! [(n+1)n! - n!]$$

$$(n-1)! [n!(n+1-1)]$$

$$(n-1)! (n!n!)$$

$$[n(n-1)!] [n!]$$

$$(n!)(n!)$$

$$(n!)^2 //$$

alternativa (D)

7. $\frac{n! + (n-1)!}{(n+1)! - n!} = \frac{6}{25}$

$$\frac{n! + (n-1)!}{(n+1)n! - n!} = \frac{6}{25}$$

$$\frac{n(n-1)! + (n-1)!}{(n+1)n! - n!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{(n+1-1)n!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{(n+1-1)n!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{n \cdot n!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{n \cdot n!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{n \cdot n(n-1)!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{n \cdot n(n-1)!} = \frac{6}{25}$$

$$\frac{(n-1)!(n+1)}{n \cdot n(n-1)!} = \frac{6}{25}$$

$$\frac{n+1}{n^2} = \frac{6}{25}$$

$$\frac{n+1}{n^2} = \frac{6}{25}$$

$$25(n+1) = 6n^2$$

$$25(n+1) - 6n^2 = 0$$

$$25n + 25 - 6n^2 = 0 \quad (-1)$$

$$6n^2 - 25n - 25 = 0$$

$$6n^2 + 5n - 30n - 25 = 0$$

$$n(6n+5) - 5(6n+5) = 0$$

$$(6n+5) \cdot (n-5) = 0$$

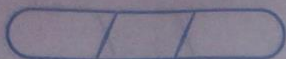
$$6n+5=0$$

$$n = -5/6 \rightarrow \text{n\~ao conv\~em}$$

$$n-5=0$$

$$n=5 //$$

alternativa (C)



8. $22! - 22$

$$22! = 22 \cdot 21 \cdot 20 \cdot 19 \cdot 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11$$

$$\cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

$$= 51090942171709440000 - 22$$

$$= 51090942171709439778$$

↑
algarismo da

dezena é 8 //

alternativa (D) //