

## **Lista de Exercícios - Aula 9**

$$5-a) 4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$$

$$\begin{aligned} b) 5! - 6! &= 5! - 6 \cdot 5! \\ &\quad 5! (+1 - 6) \\ (5 \cdot 4 \cdot 3 \cdot 2 \cdot 1) &\quad (-5) \\ (120) &\quad - (-5) \rightarrow -600 \end{aligned}$$

$$c) \frac{9!}{6!} \rightarrow \frac{9 \cdot 8 \cdot 7 \cdot 6!}{6!} \rightarrow 504$$

$$d) \frac{98!}{300!} \rightarrow \frac{98!}{300 \cdot 299 \cdot 298!} \rightarrow \frac{1}{9.900}$$

$$2 - \frac{1}{n!} = \frac{n}{(n+1)!} \rightarrow \text{efetuando, obtém-se : ?}$$

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

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

$$\frac{1}{(n+8)!}$$

## Alternative

A

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

$$\left\{ \begin{array}{l} \frac{4 - (n+2)! (n-2)!}{(n+3)! (n-1)!} = 4 \\ \frac{(n+2) \cdot (n+1)! \cdot (n-2)!}{(n+1)! (n-1) \cdot (n-2)!} = 4 \\ \frac{(n+2)}{(n-1)} = \cancel{\frac{4}{1}} \end{array} \right. \quad \left. \begin{array}{l} 4(n-1) = n+2 \\ 4n - 4 = n+2 \\ 4n - n = 2+4 \\ 3n = 6 \\ n = \frac{6}{3} \\ n = 2 \end{array} \right. \quad \rightarrow \text{Alternativa (A)}$$

$$\frac{5 - (n+1)! - n!}{(n+1)!} = \frac{7}{n+1} \quad \leftarrow \frac{n! (n+1+1)}{(n+1) \cdot n!} = \frac{7}{n+1}$$

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

Alternative D n = 7

$$6 - (n-3)! [(n+3)! - n!] = ? \quad | \quad n \in \mathbb{N}; n \geq 3$$

$\rightarrow (n-3)! [(n+3)! - n!] \quad \rightarrow n! \cdot n!$   
 $(n-3)! [(n+3) \cdot n! - n!] \quad \rightarrow (n!)^2$   
 $(n-3)! [n! (n+3-3)] \quad \rightarrow \text{Alternativa}$   
 $n \cdot (n-3)! \cdot n!$ 
D

$$\frac{7 - n! + (n-3)!}{(n+1)! - n!} = \frac{6}{25}$$

$$\frac{(n-5)!(n+1)}{n(n-3)! \cdot n} = \frac{6}{25} *$$

$$\frac{n \cdot (n-3)! + (n-3)!}{(n+1) \cdot n! - n!} = \frac{6}{25}$$

$$n+1 = 6$$

$$n = 6 - 1$$

$$\frac{(n-3)!(n+3)}{n! (n+1-3)} = \frac{6}{25}$$

$$n = 5$$

Alternativa  
C

8-0 Algarismo das dezenas do número  $23! - 22!$  é:

+ Descobrir a quantidade de 0 que termina o número  $23!$

$\rightarrow 23!$  termina em quatro zeros, pois: ( $n^{\text{o}}$  por  $\times n^{\text{o}}$  terminado em 5: múltiplo de 10)

$\rightarrow 23 : 5 \rightarrow 15$  (2 números terminados em 5). → termina em

$\rightarrow 23 : 10 \rightarrow 20$  (2 múltiplos de 10) → 4 zeros.

$$\begin{array}{r} \dots 0 \overset{9}{\cancel{1}} \overset{9}{\cancel{0}} \overset{9}{\cancel{1}} \overset{9}{\cancel{0}} \\ - \quad 2 \overset{2}{\cancel{2}} \overset{1}{\cancel{1}} \\ \hline \dots 7 \overset{7}{\cancel{7}} \overset{9}{\cancel{9}} \end{array}$$

7 dezenas + Alternativa D