

Matemática Básico - Tutorial

Nome: Bárbara O. Grosse, CTII 350.

$$\textcircled{1} \text{ a) } 4! = 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{24}$$

$$\text{b) } 5! - 6! = 5! - 6 \cdot 5! \rightarrow 5 \cdot 24(-5) = \boxed{-600} \\ = 5!(1-6)$$

$$\text{c) } \frac{9!}{6!} = \frac{9 \cdot 8 \cdot 7 \cdot 6!}{6!} = \boxed{504}$$

$$\text{d) } \frac{98!}{100!} = \frac{98!}{100 \cdot 99 \cdot 98!} = \boxed{\frac{1}{9900}}$$

$$\textcircled{2} \quad \frac{1}{n!} \cdot \frac{n}{(n+1)!} = ? \quad , \quad \frac{(n+1) \cdot n!}{n!} = n \\ (n+1)!$$

$$\left. \begin{array}{l} \frac{(n+1)! - n}{n!} \\ \hline (n+1)! \end{array} \right\} \rightarrow \frac{n+1-n}{(n+1)!} = \boxed{\frac{1}{(n+1)!}} \quad \text{alternativo} \quad \textcircled{a}$$

$$\textcircled{3} \quad \frac{(n!)^2 - (n-1)! \cdot n!}{(n-1)! \cdot n!} \rightarrow \frac{n! - (n-1)!}{(n-1)!}$$

$$\left. \begin{array}{l} \frac{n! (n! - (n-1)!) }{(n-1)! \cdot n!} \\ \hline \end{array} \right\} \rightarrow \frac{n \cdot (n-1)! - (n-1)!}{(n-1)!} \quad \text{alternativo} \quad \textcircled{a}$$

$$\frac{(n-1)! (n-1)}{(n-1)!} = \boxed{n-1} \quad \text{AFAPEL}$$

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

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

$$3n = 2 + 4$$

$$n = \frac{6}{3} = 12$$

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

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

alternative \textcircled{2} (part)

$$\textcircled{5} \quad \frac{(n+1)! - n!}{(n+1)!} = \frac{7}{n+1}, \quad n=?$$

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

$$\frac{n! \cdot (n+1-1)}{(n+1) \cdot n!} = \frac{7}{n+1} \quad \rightarrow n = 7, \quad \text{alternative d}$$

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

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

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

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

$$n \cdot (n-1)! \cdot n!$$

alternative d

$$\frac{n! \cdot n!}{n! \cdot n!} = \overline{[(n!)^2]}$$

$$\textcircled{7} \quad \frac{n! + (n-1)!}{(n+1)! - n!} = \frac{6}{25}, \quad n=?$$

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

$$\frac{(n-1)! (n+1)}{n! (n+1-1)} = \frac{6}{25} \quad * \quad n+1=6 \quad \text{permutativo} \\ n=6-1=\boxed{5} \quad \text{(C)}$$

(8) algarismo dos dígitos = $21! - 22!$

* dividindo quantidade de zeros no fim do $n^{\circ} 21!$

n° por \times n° terminado em 5 = múltiplo de 10

$$\hookrightarrow 2 \cdot 5 = 10$$

$$4 \cdot 15 = 60 (6,10)$$

$$8 \cdot 25 = 200 (2,10,10)$$

...

$\rightarrow 21 : 5, 15$ ($2 n^{\circ}$ terminados em 5) \rightarrow termine em
 $\rightarrow 21 : 10, 20$ (2 múltiplos de 10) \rightarrow 4 zeros

... 0 ~~0~~ ~~100~~ \rightarrow 7 dígitos : alternativo (D)
~~221~~
~~799~~