

Tarefa Básica

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

b) $5! - 6! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 - 6 \cdot 5!$

$$120 - 6 \cdot 120 = 120 - 720 = -600$$

$$c) \frac{9!}{6!} = \frac{9 \cdot 8 \cdot 7 \cdot 6!}{6!} = \frac{504 \cdot 6!}{720} = \frac{504 \cdot 720}{720} = 504$$

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

$$\textcircled{2} \frac{1}{n!} - \frac{n}{(n+1)!} = \frac{1}{n!} - \frac{n}{(n+1) \cdot n!} = \frac{1}{n!} \left(\frac{1-n}{n+1} \right) \Rightarrow$$

$$\Rightarrow 1 - n = \frac{n+1-n}{n+1} = \frac{1}{n+1} \cdot \frac{1}{n!} = \frac{1}{(n+1)!} \quad \text{Alternativa } \textcircled{A}$$

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

$$\Rightarrow n - 1 \quad \text{Alternativa } \textcircled{A}$$

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

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

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

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

$$\text{Alternativa } \textcircled{A}$$

$$6 = 3n$$

$$n = 2$$

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

$$n = 7$$

$$\cancel{n+1} \cancel{n+1}$$

$$n = 7$$

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

Alternativa D

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

$$\textcircled{6} \frac{(n-1)! \cdot [(n+1)! - n!]}{(n-1)! \cdot [n+1 \cdot n! - n!]}$$

Alternativa D

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

$$n! \cdot n! = (n!)^2$$

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

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

$$6n^2 = 25n + 25$$

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

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

$$\Delta = 625 - 4 \cdot 6 \cdot -25$$

$$\Delta = 1225$$

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

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

$$n = \frac{25 \pm 35}{12}$$

$$\rightarrow n' = 5$$

$$\rightarrow n'' = -10 \times$$

12

Alternativa C

$$\textcircled{8} 21! - 221$$

$$21 \cdot 20 = 420, 19 = 7980, 18 = 143.640, 17 = 2.441.880, 16 \Rightarrow 390.70080, 15 = 586051200, 14 = 8204716800, 13 \cdot 12, \dots$$

O número das dezenas e das unidades vai continuar sendo 0, então:

$$8204716800$$

$$221$$

$$82047165\textcircled{7}9$$

com a subtração, o número das dezenas fica igual a $\textcircled{7}$.

Alternativa \textcircled{D}