

Seg Ter Qua Qui Sex Sáb Dom

Tarefa Básica 9

Fatorial

1.

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

$$b) 5! - 6! = 5 \cdot 4! - 6 \cdot 5 \cdot 4!$$

$$4!(5 - 6 \cdot 5)$$

$$24 \cdot -25 = \boxed{-600}$$

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

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

2.

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

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

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

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

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

(A)

3.

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

$$= \frac{n! - (n-1)!}{(n-1)!} = \frac{n(n-1)! - (n-1)!}{(n-1)!} = \frac{n-1}{1} = \underline{n-1} \quad (A)$$

4.

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

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

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

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

$$3n = 6$$

$$n = 6/3 = \underline{2}$$

par

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

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

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

$$(n-1)$$

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

(A)

5.

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

$$\rightarrow 1 = \frac{7}{n+1} + \frac{1}{n+1}$$

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

$$\frac{8}{n+1} = 1$$

$$n+1 = 8$$

$$n = 8-1$$

$$\underline{n=7}$$

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

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

(D)

6.

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

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

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

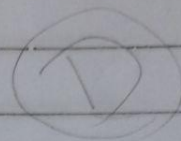
$$(n-1)! (n!n) \rightarrow$$

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

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

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

$$(n!)^2$$



7.

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

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

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

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

$$\rightarrow 25(n+1) = ((n+1)n - n)6$$

$$25n + 25 = (n^2 + n - n) \cdot 6$$

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

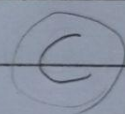
$$6n^2 - 25n - 25 = 0$$

$$\Delta = 625 - 4 \cdot (-150)$$

$$\Delta = 625 + 600 = 1225$$

$$n = \frac{25 \pm 35}{12} \quad n' = \frac{5}{1}$$

$$n'' = -\frac{10}{12} \quad n'' \text{ não convém}$$



8.

$$21! - 221$$

$$21 \cdot 20 \cdot 19 \cdot 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \rightarrow$$

$$4 \cdot 3 \cdot 2 \cdot 1 - 221$$

$$= 51 \ 090 \ 942 \ 171 \ 709 \ 440 \ 000 - 221$$

$$= 51 \ 090 \ 942 \ 171 \ 709 \ 439 \ 779$$

