Beatriz Bastos Borges Nº 03 CTII 350

Tarefa Básica

1. a) $4! = 4.3.2.1 \rightarrow \boxed{4! = 24}$

b) $5! - 6! \rightarrow 5.\underbrace{4!}_{24} - 6! \rightarrow 120 - 6.\underbrace{5!}_{120} \rightarrow 120 - 720$

$\boxed{5! - 6! = -600}$

c) $\frac{9!}{6!} \rightarrow \frac{9.8.7.6!}{6!} \rightarrow \boxed{\frac{9!}{6!} = 504}$

d) $\frac{98!}{100!} \rightarrow \frac{98!}{100.99.98!} \rightarrow \boxed{\frac{98!}{100!} = \frac{1}{9900}}$

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

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

$\boxed{\frac{1}{n!} - \frac{n}{(n+1)!} = \frac{1}{(n+1)!}}$ Alternativa A | F

3. $\frac{(n!)^2 - (n-1)!\,n!}{(n-1)!\,n!} \rightarrow \frac{n![n! - (n-1)!]}{(n-1)!\,n!} \rightarrow \frac{n! - (n-1)!}{(n-1)!}$

$\frac{n.(n-1)! - (n-1)!}{(n-1)!} \rightarrow \frac{(n-1)![n-1]}{(n-1)!} \rightarrow \boxed{n-1}$

Alternativa A

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

$\frac{(n+2)}{(n-1)} = 4 \rightarrow n+2 = 4n-4 \rightarrow 6 = 3n \rightarrow \boxed{n=2}$

Alternativa A

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

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

$(n+1)-1 = 7 \rightarrow \boxed{n=7}$ **Alternativa D**

6. $(n-1)![(n+1)! - n!] \rightarrow (n-1)![(n+1).n.(n-1)! - n.(n-1)!]$

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

$(n-1!)^2.\, n^2 \rightarrow [n(n-1)!][n(n-1)!] \rightarrow (n!).(n!)$

$\boxed{(n!)^2}$ **Alternativa D**

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

$\frac{(n-1)![n+1]}{(n-1)![(n+1)n - n]} = \frac{6}{25} \rightarrow \frac{n+1}{n^2+n-n} = \frac{6}{25}$

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

$\Delta = 25^2 - 4.(-6).25$

$\Delta = 625 + 600$

$\Delta = 1225$

$n = \frac{(-25) \pm \sqrt{1225}}{2.(-6)} = \frac{(-25) \pm 35}{(-12)}$

- $\frac{15}{(-12)} = \frac{5}{(-6)}$ não convém
- $\frac{(-60)}{(-12)} = \boxed{5}$

Alternativa C

8. $21! - 221$ → algarismo da dezena?

O final do fatorial 21! terminará em zero e a quantia do mesmo será definida pelo número de fatores 5 que 21! apresenta. Como o fatorial 21! contém 5, 10, 15 e 20, ele terminará em quatro zeros.

Sendo assim:

$$\begin{array}{r} \ldots 0000 \\ - \quad\quad 221 \\ \hline \ldots 9779 \end{array}$$

↳ a dezena corresponde a 7

Alternativa D