Aluno: **Leonardo Yukio Aoki**
Prontuário: **CB1990233**
Turma: **CTII 348**
IFSP - Câmpus Cubatão

Seg Ter Qua Qui Sex Sáb Dom

Tarefa Básica 9
Fatorial

1.

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

b) $5! - 6! = 5.4! - 6.5.4!$

$4!(5 - 6.5)$

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

c) $\frac{9!}{6!} = \frac{9.8.7.\cancel{6!}}{\cancel{6!}} = \boxed{504}$

d) $\frac{98!}{100!} = \frac{\cancel{98!}}{100.99.\cancel{98!}} = \frac{1}{100.99} = \boxed{\frac{1}{9\,900}}$

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

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

$\frac{1}{n!.(n+1)}$ →

(A)

3.

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

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

(A)

4.

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

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

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

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

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

$n+2 = 4n-4$

$4n - n = 2+4$

$3n = 6$

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

par

(A)

5.

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

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

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

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

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

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

$n+1 = 8$

$n = 8-1$

$\boxed{n = 7}$

(D)

6.

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

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

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

$(n-1)!(n!\cdot n) \rightarrow \boxed{(n!)^2}$ (D)

7.

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

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

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

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

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

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

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

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

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

$\Delta = 625 + 600 = 1225$

$n = \frac{25 \pm 35}{12}$ — $n' = \boxed{5}$

$n'' = -\frac{10}{12}$ não convém

(C)

8.

$21! - 221$

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

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

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

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

$\boxed{7}$ (D)