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Disciplina: Matemática

IFSP - Câmpus Cubatão

Tarefa Básica 1
Fatorial de um Número Natural
(Fotos nas páginas seguintes)

Exercícios 1 e 2:

D S T Q Q S S

Sanfor Boavida 1 - 2º Bimestr

Introdução

1-) Calcule

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

$$b) 5! - 6! = 5! - 6 \cdot 5! \Rightarrow 5!(1 - 6) \Rightarrow 5 \cdot 4! \cdot (-5)$$

$$5 \cdot 24 \cdot (-5) \Rightarrow -120 \cdot 5 \Rightarrow -600 \text{ m}$$

A resposta

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

$$d) \frac{98!}{100!} \Rightarrow \frac{98!}{100 \cdot 99 \cdot 98!} \Rightarrow \frac{1}{100 \cdot 99} \Rightarrow \frac{1}{9900} \text{ m}$$

$$2-) \text{ Efetuando-se } \frac{1}{n!} - \frac{1}{(n+1)!}, \text{ obtém-se:}$$

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

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

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

Exercícios 3 e 4:

3) $\frac{(n!)^2 - (n-1)! n!}{(n-1)! n!}$, simplificando, obtem-se:

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

$$\therefore \frac{(n!)^2}{(n-1)! n!} - 1 \Rightarrow n! \cancel{n!} - 1 \Rightarrow \frac{n!}{(n-1)!} = 1 \quad \text{I} \rightarrow$$

$$\therefore \frac{n \cdot (n+1)}{(n-1)!} - 1 \Rightarrow \frac{n}{1} - \frac{1}{1} \Rightarrow \boxed{n-1} \quad \text{Linha A}$$

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

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

$$\therefore (n+2) \cdot \frac{1}{(n-1)!} = 4 \Rightarrow \frac{(n+2)!}{(n-1)!} = 4 \quad \text{I} \rightarrow$$

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

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

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

$$6 = 3n$$

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

$$\boxed{n=2} \rightarrow \text{Pon}$$

Linha A.

Exercícios 5 e 6:

D S T Q Q S S

$$5 \rightarrow \frac{(n+1)! - n!}{(n+1)!} = \pm \quad n=3 \quad \begin{array}{l} s=n \\ 20 = [(n-1) + 1]n! - n \cdot (n+1) \end{array}$$

$$\frac{(n+1)! - n!}{(n+1)!} = \pm \Rightarrow 1 - \frac{n!}{(n+1)!} = \pm \quad \therefore$$

$$\therefore 1 - \frac{n!}{(n+1) \cdot n!} = \pm \Rightarrow 1 - \frac{1}{n+1} = \pm \quad \therefore$$

$$\therefore \frac{1}{1} = \frac{\pm}{n+1} + \frac{1}{n+1} \Rightarrow 1 = \frac{\pm}{n+1} \Rightarrow \pm = 1(n+1)$$

$$\pm = n+1 \quad \boxed{n=7 \text{ m} \rightarrow \text{álgebra}}$$

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$$6 \rightarrow (n-1)! \cdot [(n+1)! - n!]^2 = ?$$

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

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

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

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

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

$$(n-1)![(n-1) \cdot (n^2)] =$$

$$(n-1)![(n-1) \cdot (n \cdot n)] =$$

$$[(n \cancel{(n-1)!}), (n \cancel{(n-1)!})] =$$

$$(n!) \cdot (n!) = \boxed{(n!)^2} \quad \boxed{n \rightarrow \text{álgebra}}$$

Exercício 7:

$$7) \frac{n! + (n-1)!}{(n+1)! - n!} = \frac{6}{25} \Rightarrow \frac{n(n-1)! + (n-1)(n-2)!}{(n+1) \cdot n(n-1)! - n \cdot (n-1)!} = \frac{6}{25} \therefore$$

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

$$\therefore \frac{(n+1)}{(n+1) \cdot n - n} = \frac{6}{25} \Rightarrow \frac{n+1}{n^2 + n - n} = \frac{6}{25} \therefore$$

$$\therefore \frac{n+1}{n^2} = \frac{6}{25} \Rightarrow 6n^2 = 25(n+1)$$

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

$$D = (-25)^2 - 4 \cdot 6 \cdot (-25) \quad | \quad 25 \pm 35 \rightarrow n' = \frac{25+35}{2}$$

$$P = 625 + 600 \quad \left. \right\} 12 \quad 12$$

$$D = 1425 \rightarrow \sqrt{1425} = 35$$

$$n=60 \rightarrow n=5$$

$$n = 25 - 35$$

Lo setra c.

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$$n = -10$$

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28) *Conium*.

Exercício 8:

8- $21! - 22!$ → Algarismo das dezenas?

$$(21 \cdot 20 \cdot 19 \cdot 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6!) - 22!$$

$$(420 \cdot 342 \cdot 272 \cdot 210 \cdot 150 \cdot 110 \cdot 504 \cdot 720) - 221$$

$$510\,909\,421\,717\,094\,400\,000 - 221 = ?$$

$$\therefore = 510\,909\,421\,717\,084\,397\,\boxed{1} \quad \text{Algarismo das dezenas} = 7$$

Algarismo das dezenas

Setor 1