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Nome: Matheus Henrique CTIQ 31?

Fatorial de um numero natural

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

b) $5! - 6! = 5! - 6! \cdot 5! = 5! \cdot (1-6) = 5! \cdot (-5) = 600$

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

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

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

$\frac{(n+1).n! - n.n!}{n!(n+1)!} \rightarrow \frac{\cancel{n!}(n+1-n)}{\cancel{n!}(n+1)!} = \boxed{\frac{1}{(n+1)!}}$

(3) $\frac{(n!)^2 - (n-1)!\,n!}{(n-1)!\,n!} = \frac{(n(n-1)!)^2 - (n-1)!\,n(0-1)!}{(n-1)!\,n(n-1)!} =$

$\frac{(n-1)!\,[(n)^2 - n]}{(n-1)!\,[n]} = \frac{n(n-1)}{\cancel{x}} = \boxed{n-1}$

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

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

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

Portanto, n é PAR

(5) $\frac{(n+1)! - n!}{(n+1)!} = \frac{(n+1)\,n! - n!}{(n+1)\,n!} = \frac{n!\,[(n+1)-1]}{n!\,(n+1)}$

$\frac{n}{n+1} = \frac{7}{n+1}$ logo, $\boxed{n=7}$

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

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

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

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

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

$[n!]\,n!$

$\boxed{(n!)^2}$

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

$\dfrac{(n-1)!\,[n+1]}{(n-1)!\,[(n+1)n - n]} = \dfrac{n+1}{n^2+n-n} = \dfrac{n+1}{n^2} = \dfrac{6}{25} = \dfrac{5+1}{5^2}$

Portanto $n = 5$

(8) $21! - 221$

$= 21.20.19.18.17.16.15.14.13.12.11.10.9.8.7.6.5.4! - 221$

$20.15.10.5 = 15000$

$$\begin{array}{r} \ldots 000 \\ -\;221 \\ \hline 779 \end{array}$$

o algarismo das dezenas de $21! - 2$ é igual a 7