Aluno: Sabrina Vitória Pereira de Souza Ribeiro CTII350

Lista de exercícios

1. a) $4! = 4.3.2.1 = 24$ //

b) $5! - 6!$

$5! = 5.4.3.2.1 = 120$

$6! = 6.5! \rightarrow 6.120 \rightarrow 720$

$5! - 6! = 120 - 720 = -600$ //

c) $9!/6!$

$9! = 9.8.7.6! = 9.8.7.720 = 362880$

$9!/6!$

$362880 / 720 = 504$ //

d) $98!/100!$

$100! = 100.99.98!$

$98!/100.99.98!$

$1/9900$ //

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

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

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

alternativa (A) //

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

$\frac{n!\,.\,n! - (n-1)!\,n!}{(n-1)!\,n!}$

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

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

$\frac{n-1}{1} = n-1$ //

alternativa (A) //

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

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

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

$n+2 = 4.(n-1)$

$n+2 = 4n-4$

$2+4 = 4n-n$

$6 = 3n$

$n = 6/3$

$n = 2$ //

alternativa (A) //

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

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

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

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

$n = 7$ //

alternativa (D) //

6. $n \in N$, $n \geq 1$

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

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

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

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

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

$(n!)(n!)$

$(n!)^2$ // alternativa (D)

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

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

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

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

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

$\frac{n+1}{n^2} = \frac{6}{25}$

$25(n+1) = 6n^2$

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

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

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

$6n^2 + 5n - 30n - 25 = 0$

$n(6n+5) - 5(6n+5) = 0$

$(6n+5).(n-5) = 0$

$6n + 5 = 0$

$n = -5/6$ → não convém

$n - 5 = 0$

$n = 5$ //

alternativa (C)

8. $21! - 221$

$21! = 21 \cdot 20 \cdot 19 \cdot 18 \cdot 17 \cdot 16 \cdot 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11$
$\cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$
$= 51090942171709440000 - 221$
$= 51090942171409439779$

↑ algarismo da dezena é 7 //

alternativa (D) //