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Sujeito Básica - Fatorial de um número natural

1.

a)  $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$

c)  $9! \rightarrow 6! = 720$

b)  $5! - 6! = 5! = 120$

6!

$9! = 9 \cdot 8 \cdot 7 \cdot 6! = 362,880 = 504$

$6! = 6 \cdot 5! = 120 \cdot 6 = 720$

720

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

d)  $\frac{98!}{100!} \rightarrow \frac{98!}{(100 \cdot 99 \cdot 98!)} = \frac{1}{9900}$

2.  $\frac{1-n}{n(n+1)} \rightarrow \frac{\cancel{1}}{(n+1)\cancel{n}} = \frac{1}{(n+1)} = \frac{1}{n!} \cdot \frac{1-n}{(n+1)n!} = \frac{1}{n!} \cdot \left(\frac{1-n}{n+1}\right)$

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

R: bateria A

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

$$\frac{n.(n-1)! - (n-1)}{(n-1)} \rightarrow \frac{n-1}{1} \Rightarrow n-1 \quad R.A)$$

$$04. \frac{(n+2)! \cdot (n-2)!}{(n+1)! (n-1)} = 4$$

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

R: a)

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

$$(n+2) = 4 \cdot (n+1)$$

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

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

$$3n = 6$$

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

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

*Locutio recensio, cui et levata est modo I. ad hoc*

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

$$\frac{n}{n+1} = \underline{7} \rightarrow n = 7 \quad \text{R: d)}$$

$$\frac{n+1}{n+1} = \underline{1}, \text{ f. d. P.} = 1 \text{ P}$$

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

$$00PP \quad (\text{R. P. M.}) \quad !001$$

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

$$= (n!) \cdot (n!) = (n!)^2 \quad \text{R: d)}$$

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

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

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

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

$$\Delta = (-25)^2 - 4 \cdot 6 \cdot (-25) \quad n = \frac{25 \pm \sqrt{1225}}{12} \quad n' = \frac{25+35}{12} = \frac{60}{12} = 5,$$

$$\Delta = 625 + 600$$

$$\Delta = 1225 \quad n = \frac{25 \pm 35}{12} \quad n' = \frac{25-35}{12} = -\frac{10}{12}$$

R: 5