TAREFA: FATORIAL

1.

a) $4! = 4.3! = \boxed{24}$

b) $5! - 6! = 5! - 6.5!$

$1.5! - 6.5!$

$(1-6).5!$

$-5.5!$

$-5.120 = \boxed{-600}$

c) $\frac{9!}{6!} = \frac{9.8.7.6!}{6!}$

$9.8.7 = \boxed{504}$

d) $\frac{98!}{100!} = \frac{98!}{100.99.98!} \rightarrow \frac{1}{100.99} \rightarrow \boxed{\frac{1}{9900}}$

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

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

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

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

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

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

$n+2 = 4n-4$

$4n-n = 2+4$

$3n = 6$

$n = 6/3$

$n = 2$ (A)

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

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

$n = 7$ (D)

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

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

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

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

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

$(n-1)![(n-1)!(n^2)]$

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

$(n!).(n!)$

$(n!)^2$ (D)

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

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

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

$6n^2 = 25n + 25$

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

$\Delta = (-25)^2 - 4.6.-25$

$\Delta = 625 + 600$

$\Delta = 1225$

$n = \frac{25 \pm \sqrt{1225}}{2.6}$

$n = \frac{25 \pm 35}{12} \rightarrow \frac{25+35}{12} = \frac{60}{12} = 5$

$\frac{25-35}{12} = \frac{-10}{12} = 0,8$

R: 5 (C)

8. $21! - 221 = 21! = 21.20! = 51090942171709440000 - 221$

51090942171709439779 → 7

R: (D)