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

b) $5! - 6!$ $\quad 5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

$-6 \cdot 5! + 5!$

$5!(-6+1)$

$120(-5) = -600$

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

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

② $\frac{1}{n!} - \frac{n}{(n+1)!}$

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

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

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

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

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

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

(A)

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

$\frac{n(n-1)!)^2 - (n-1)! [n(n-1)!]}{(n-1)! (n(n-1)!)}$

$(n-1) \quad \frac{((n-1)!)^2 - 1! \cdot n \cdot 1!}{1! \cdot n \cdot 1!}$ (A)

$\frac{n^2 - n}{n} = n-1$

④ $\frac{(n+2)\,n! \,(n-2)!}{(n+1)! \,(n-1)! \cdot n!} = 4$ $\begin{cases} n+2 = 4n-4 \\ -3n = -6 \\ n = 2 \end{cases}$

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

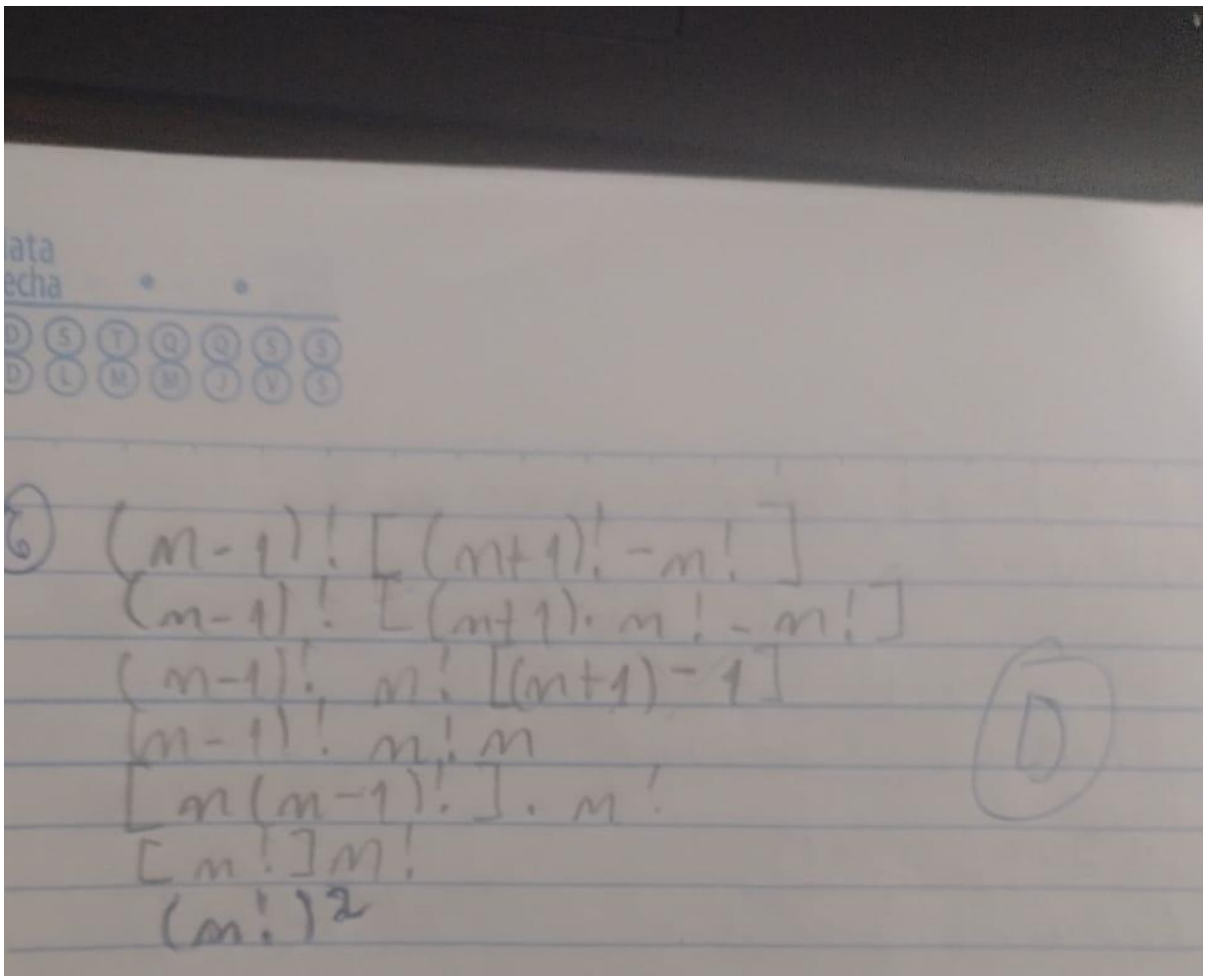
⑤ $\frac{(n+1)! - n!}{(n+1)!} = \frac{7}{n+1}$

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

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

$1 - \frac{1}{n+1} = \frac{7}{n+1}$

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


ata
echa
D S T Q Q S S
D L M M J V S
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!
(n!)²
D

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

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

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

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

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

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

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

$\Delta = 625 - 4.6.(-25)$

$\Delta = 1225$

⑥

$n \in \mathbb{N}$

$n! \neq 0$

$n! \neq 1$

$n_1 = \frac{25+35}{12} = 5$

$n_2 = \frac{25-35}{12} = \frac{-10}{12} = \frac{-5}{6}$

$\boxed{n=5}$ ⑥

$[n!]^n$

$(n!)^2$

⑦ $21! - 221$

$21! = x + 1000$

1000

-229

779

⑦