Name: Amanda Chen Zhen CTII.348

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

b. $5! - 6! = (5.4.3.2.1) - (6.5.4.3.2.1) = 120 - 720 = -600$

c. $\frac{9!}{6!} = \frac{9.8.7.6!}{6!} = 9.8.7 = 504$

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

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

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

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

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

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

Letra A

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

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

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

Letra A.

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

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

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

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

$4n - 4 = n + 2$

$3n = 6$

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

$n = 2$

Letra A.

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

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

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

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

$7n + 7 = n^2 + n$

$-n^2 + 6n + 7 = 0$

$\Delta = b^2 - 4ac$

$\Delta = 36 + 28$

$\Delta = 64$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{-6 \pm 8}{-2}$ $\quad x' = \frac{2}{-2} = -1$ (não convém)

$x'' = \frac{-14}{-2} = 7$ //

Letra D.

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

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

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

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

$n! \cdot n!$

$(n!)^2$

Letra D.

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

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

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

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

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

$6n^2 = 25n + 25$

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

$\Delta = b^2 - 4ac$

$\Delta = (-25)^2 - 4 \cdot 6 \cdot (-25)$

$\Delta = 625 + 600$

$\Delta = 1225$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{25 \pm 35}{12}$

$x' = \frac{60}{12} = 5$

$x'' = \frac{-10}{12}$ (não convém)

Letra C.

8. $21! - 221$

$21! = 21.20.19 \ldots 3.2.1 = 51090942171709440000$

51090942171709440000

$-\quad 221$

51090942171709440779

dezena

Letra D.