**Evelyn Santos de Santana**

**CTII348**

**Coeficientes Binomiais - Triângulo de Pascal/Tartaglia**

① $\binom{8}{3} = \frac{8!}{3!\,5!} = \frac{8.7.6.\cancel{5!}}{3.2.1\,\cancel{5!}} = \frac{8.7.6}{3.2.1} = \frac{336}{6} = \boxed{59}$

② $\binom{200}{198} = \frac{200!}{198!\,2!} = \frac{200.199.\cancel{198!}}{\cancel{198!}.2.1} = \frac{200.199}{2.1} = \frac{39800}{2} \therefore$

$\therefore \underline{19900}$

③ $\binom{n-1}{2} = \binom{n+1}{4}$

$\frac{(n-1)!}{2!\,(n-1-2)!} = 0$

$\frac{(n-1)(n-2)(n-3)!}{2.1\,(n-3)!} = 0$

$\frac{n^2-2n-n+2}{2} = 0$

$0{,}5n^2 - 1{,}5n + 1 = 0$

$\boxed{\begin{array}{l} 1 + 2 = 3 \\ 1 \cdot 2 = 2 \end{array}}$

$V = \{1,2,3\}$

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

$\frac{\cancel{(n-1)!}}{2!\,\cancel{(n-3)!}} = \frac{(n+1)\,n\,\cancel{(n-1)!}}{4!\,\cancel{(n-3)!}}$

$\frac{1}{2} = \frac{n^2+n}{24}$

$2n^2 + 2n = 24$

$2n^2 + 2n - 24 = 0$

$3 + (-4) = -1$

$3 \cdot (-4) = -12$

(-4) ñ convem

4) $\binom{20}{13} + \binom{20}{14} = ?$

SOMA de dois consecutivos

$\binom{20}{13} + \binom{20}{14} = \binom{20+1}{13+1} = \binom{21}{14}$

Complementar

$\binom{21}{14} = \binom{21}{7} \rightarrow$ C

$14 + 21 - 14 = 21$

5) $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \ldots + \binom{n}{n} = ?$

Soma na linha n

$n \rightarrow$ número de linha

$\boxed{2^n}$

6) a) $\sum_{p=0}^{10} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \binom{10}{2} + \ldots + \binom{10}{10}$

SOMA na linha 10

$2^{10} = \boxed{1024}$

b) $\sum_{p=0}^{9} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \binom{10}{2} + \dots + \binom{10}{9}$

SOMA NA LINHA 10 $= 2^{10} - \binom{10}{10}$

$2^{10} - 1$

$1024 - 1$

$\boxed{1023}$

c) $\sum_{p=2}^{9} \binom{9}{p} = \binom{9}{2} + \binom{9}{3} + \dots + \binom{9}{9}$

SOMA NA LINHA $= 2^9 - \binom{9}{0} - \binom{9}{1}$

$2^9 - 1 - 9$

$512 - 10$

$\boxed{502}$

d) $\sum_{p=4}^{10} \binom{p}{4} = \binom{4}{4} + \binom{5}{4} + \binom{6}{4} + \binom{7}{4} + \binom{8}{4} + \binom{9}{4} + \binom{10}{4}$

TRIAGULO DE PASCAL $1 + 5 + 15 + 35 + 70 + 126 + 210$

$\boxed{462}$

e) $\sum_{p=5}^{10} \binom{p}{5} = \binom{5}{5} + \binom{6}{5} + \binom{7}{5} + \binom{8}{5} + \binom{9}{5} + \binom{10}{5}$

TRIAGULO DE PASCEL $1 + 6 + 21 + 56 + 126 + 252$

$\boxed{462}$

7) $\sum_{k=0}^{m} \binom{m}{k} = 512$ $\quad m = ?$

$512 \Rightarrow 2^m = 2^9 = m = 9$

$2 \cdot 2$

$4 \cdot 2$

$8 \cdot 2$

$16 \cdot 2$

$32 \cdot 2$

$64 \cdot 2$

$128 \cdot 2$

$256 \cdot 2$

$\underline{512}$