nome: Matheus Henrique CTII 317

01. $\binom{8}{3} = \frac{8!}{3!5!} = \frac{8.7.6.\cancel{5!}}{6.\cancel{5!}} = \boxed{56}$

02. $\binom{200}{198} = \frac{200!}{198!2!} = \frac{\overset{100}{\cancel{200}}.199.\cancel{198!}}{\cancel{2}.1.\cancel{198!}} = 19.900$

03 $\binom{n-1}{2} = \binom{n+1}{4}$ $n>0$

$2+4=6$

Complementares: $n>x + n+x \leq 6$

$2n \leq 6 \therefore n \leq 3$

$S = \{n \in \mathbb{N} \mid 0 < n \leq 3\}$

$\boxed{S = \{1,2,3\}}$

04 $\binom{n}{p} + \binom{n}{p+1} = \binom{n+1}{p+1}$

Complementar $14+7=21$

$\binom{20}{13} + \binom{20}{14} = \boxed{\binom{21}{14}} = \binom{21}{7}$

05 $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \ldots \binom{n}{n}$ linha / coluna

no triangulo de Pascal Itantaglia, a soma dos Elementos na linha n será $2^n$

06

a) $\sum_{p=0} \binom{10}{p} = 2^n = 2^{10} = \boxed{1024}$

b) $\sum_{p=0} \binom{9}{p} \quad 2^{10} - 1 = 1024 - 1 = 1023$

c) $\sum_{p=2}^{9} \binom{9}{p} = 2^9 - 1 - 9 = 512 - 10 = \boxed{502}$

d) $\sum_{p=4}^{10} \binom{p}{4} = \binom{n+1}{k+1} = \binom{11}{5} = \frac{11!}{5!\,6!} = \frac{11\cdot \cancel{10}^{2}\cdot \cancel{9}^{3}\cdot \cancel{8}^{2}\cdot 7\cdot \cancel{6!}}{\cancel{5}\cdot \cancel{4}\cdot \cancel{3}\cdot \cancel{2}\cdot 1\cdot \cancel{6!}} =$

$11\cdot 3\cdot 2\cdot 7 = 462$

e) $\sum_{p=5}^{10} \binom{p}{5} = \binom{n+1}{k+1} = \cancel{\binom{11}{}} \binom{11}{6} = 462$

07. $\sum_{k=0}^{n} \binom{n}{k} = 512$

Soma da linha $= 2^n$

$512 = 2^9$

$n = 9$

| | |
|---|---|
| 512 | 2 |
| 256 | 2 |
| 128 | 2 |
| 64 | 2 |
| 32 | 2 |
| 16 | 2 |
| 8 | 2 |
| 4 | 2 |
| 2 | 2 |
| 1 | |

$512 = 2^9$