Coeficiente Binominal Triângulo de Pascal e Tartaglia

~ Tarefa Básica ~

01) $\binom{8}{3} = \dfrac{8!}{3!(8-3)!} = \dfrac{8!}{3!\,5!} = \dfrac{8.7.6.\cancel{5!}}{3.2.1.\cancel{5!}} = \dfrac{336}{6} = 56$ //

02) $\binom{200}{198} = \dfrac{200!}{198!(200-198)!} = \dfrac{200!}{198!\,2!} = \dfrac{200.199.\cancel{198}}{\cancel{198!}\,2!} = \dfrac{39.800}{2} =$

19900 //

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

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

$4n-4 = 2n+2$

$2n = 6$

$n = \dfrac{6}{2} = 3$

$n <= 3 \rightarrow \{1, 2, 3\}$ //

04) $\binom{20}{13} + \binom{20}{14} = \dfrac{21^{:2}}{14^{:2}} = \dfrac{21}{7}$

05) $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \ldots + \binom{n}{n} =$ soma na linha $n \rightarrow 2^n$

06) a) $\displaystyle\sum_{p=0}^{10} \binom{10}{p} = 2^{10} = 1024$

b) $\displaystyle\sum^{9} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \binom{10}{2} + \binom{10}{3} + \ldots + \binom{10}{9}$

linha 10 - (10)

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

linha 9 $- \binom{9}{0} - \binom{9}{1} = 2^9 - 1 - 9 = 512 - 10 = 502$ //

d) $\sum_{p=4}^{10} \binom{p}{4} = \binom{4}{4} + \binom{5}{4} + \dots + \binom{10}{4} = \binom{11}{5}$

$\binom{11}{5} = \frac{11!}{5!(11-5!)} = \frac{11!}{5!6!} = \frac{11.10.9.8.7.\cancel{6!}}{5.4.3.2.1.\cancel{6!}} = \frac{55440}{120} = 462$ //

e) $\sum_{p=5}^{10} \binom{p}{5} = \binom{5}{5} + \binom{6}{5} + \binom{7}{5} + \dots + \binom{10}{5} = \binom{11}{6}$

$\binom{11}{6} = \frac{11!}{6!(11-6!)} = \frac{11.10.9.8.7.\cancel{6!}}{\cancel{6!}5.4.3.2.1} = \frac{55440}{120} = 462$ //

07 $\sum_{k=0}^{m} \binom{m}{k} = 512 \rightarrow 2^9 = 512$

$m = 9$

$\sum_{k=0}^{9} \binom{9}{k} = \binom{9}{0} + \binom{9}{1} + \binom{9}{2} + \dots + \binom{9}{9} =$

soma na linha $9 \rightarrow 2^9 = 512$ //