Tarefa Bardo - Coeficientes Binomiais

Nome: Vinicius Vitoriano da Silva
Turma: CT11317

1- a) $\binom{8}{3} = \frac{8!}{3!(8-3)!} = \frac{8!}{3!\,5!} = \frac{8.7.6.\cancel{5!}}{3.2.1.\cancel{5!}}$

$= \frac{336}{6} = 56$ B

2- $\binom{200}{198} = \frac{200!}{198!\,(200-198)!} = \frac{200!}{198!\,2!}$

$\frac{200.199.\cancel{198!}}{\cancel{198!}\,2.1} = \frac{39.800}{2} = 19900$

A

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

?

4- $\binom{20}{13} + \binom{20}{14} =$ 2 consecutivos de 20

$\binom{21}{14}$

R: ?

__/__/__

5 - (ITA) $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\dots+\binom{n}{n}$?

Como o resultado normal da soma de cada linha são potências de 2, exemplo:

linha 0 → 2^{0}
linha 1 → 2^{1}
linha 2 → 2^{2}

logo, o resultado da linha n é:

linha n → 2^n

6 -

a) $\sum_{p=0}^{10}\binom{10}{p}=\binom{10}{0}+\binom{10}{1}+\binom{10}{2}+\binom{10}{3}+\dots+\binom{10}{10}=$

linha 10 → $2^{10}=1024$

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

$2^{10}-\binom{10}{10}$ → $1024-1=1023$

c) $\sum_{p=2}^{9} \binom{9}{p} = \binom{9}{2} + \binom{9}{3} + \binom{9}{4} + \binom{9}{5} \dots \binom{9}{9}$

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

$\frac{9!}{0!\,9!} = 1, \quad \frac{9!}{1!\,8!} = \frac{9}{1} = 9$

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

$\binom{4}{4} = \frac{4!}{4!\,0!} = 1 \qquad \binom{5}{4} = \frac{5!}{4!\,1!} = 5$

$\binom{6}{4} = \frac{6!}{4!\,2!} = 15 \qquad \binom{7}{4} = \frac{7!}{4!\,3!} = 35$

$\binom{8}{4} = 70 \qquad \binom{9}{4} = 126 \qquad \binom{10}{4} = 210$

R: $1 + 5 + 15 + 35 + 70 + 126 + 210 = 462$

e) $\sum_{p=5}^{10} \binom{p}{5} = \binom{5}{5} = \frac{120}{120} = 1$

$\binom{6}{5} = \frac{6!}{5!\,1} = \frac{6}{1} = 6$

$\binom{7}{5} = \frac{7!}{5!\,2!} = \frac{42}{2} = 21$

$\binom{8}{5} = 56$ $\binom{9}{5} = 126$ $\binom{10}{5} = 252$

R: $1 + 6 + 21 + 56 + 126 + 252 = 462$

7) (FGV)

$\sum_{k=10}^{m} \binom{m}{k} = 512$

linha 2^m

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

$\cancel{2}^m = \cancel{2}^9$

$m = 9$