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Tarefa Básica - Coeficientes Binomiais

01) $\binom{8}{3} = \frac{8!}{3!(8-3)!} = \frac{8.7.6.\cancel{5!}}{3.2.1!\cancel{5!}} = \frac{336}{6} = 56$ R: B

02) $\binom{200}{198} = \frac{200}{198(200-198)!} = \frac{200.199.\cancel{198}}{\cancel{198}!\ 2.1!} = \frac{39800}{2} = 19900$ R: A

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

$n > 0$

$n > 0$ e $n \leq 3$

complementar

$(n-1) + (n+1) \leq 6$

$n-1+n+1 \leq 6$

$2n \leq 6$

$n \leq \frac{6}{2}$

$n \leq 3$

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

linhas iguais

04) $\binom{20}{13} + \binom{20}{14} = \binom{21}{14}$

2 consecutivos - linha 20

05) $\binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n}$? $= 2^n$

Potência 2

Linha consecutiva de n

S T Q Q S S D

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

10 d. final

d. inicial

$= 1024$ //

b) $\sum_{p=0}^{9} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \binom{10}{2} + \dots + \binom{10}{9} = 1023$ //

linha 10 $2^{10} - \binom{10}{10}$

$1024 - 1 = 1023$

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

$1 + 5 + 15 + 35 + 70 + 126 + 210 = 462$ //

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

$1 \quad 6 \quad 21 \quad 56 \quad 126 \quad 252 \quad 462$ //

d) $\frac{5!}{4!(5-4)} = \frac{5 \cdot \cancel{4!}}{\cancel{4!}\, 1!} = 5$; $\frac{6!}{4!(6-4)} = \frac{6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 2!} = \frac{30}{2} = 15$

$\frac{7!}{4!(7-4)} = \frac{7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 3 \cdot 2 \cdot 1!} = 35$; $\frac{8!}{4!(8-4)} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!}\, 4 \cdot 3 \cdot 2 \cdot 1} = 70$

$\frac{9!}{4!(9-4)} = \frac{9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!} \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 126$; $\frac{10!}{4!(10-4)} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot \cancel{4!}}{\cancel{4!}\, 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 210$

e) $\frac{6!}{5!(6-5)} = \frac{6 \cdot \cancel{5!}}{\cancel{5!}\, 1!} = 6$; $\frac{7!}{5!(7-5)!} = \frac{7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!}\, 2 \cdot 1!} = 21$

$\frac{8!}{5!(8-5)!} = \frac{8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!}\, 3 \cdot 2 \cdot 1!} = 56$; $\frac{9!}{5!(9-5)!} = \frac{9 \cdot 8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!}\, 4 \cdot 3 \cdot 2 \cdot 1!} = 126$

$\frac{10!}{5!(10-5)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot \cancel{5!}}{\cancel{5!}\, 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1!} = 252$

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

$$2^m = 512$$

$$2^m = (2.2.2.2.2.2.2.2.2)$$

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

$$\boxed{m = 9}$$

R: E //