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DOM SEG TER QUA QUI SEX SÁB
DOM LUN MAR MIÉ JUE VIE SÁB

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Coeficientes Binominais - Triângulo de Pascal Tartaglia

1. $\binom{8}{3} = \frac{8!}{3!5!} = \frac{8.7.6.\cancel{5!}}{3.2.1.\cancel{5!}} = \frac{336}{6} = 56$

Resposta: alternativa B

2. $\binom{200}{198} = \frac{200!}{198!2!} = \frac{200.199.\cancel{198!}}{\cancel{198!}.2.1} = \frac{39800}{2} = 19900$

Resposta: alternativa A

3. $\binom{n-1}{2} = \binom{n+1}{4}$ ou $n < k$

$n-1 < 2$ e $n+1 < 4$

$n < 2+1$ $\quad n < 4-1$

$n < 3$ $\quad n < 3$

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

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

$\frac{(n-1)!.4.3.\cancel{2!(n-3)!}}{\cancel{2!(n-3)}} = (n+1)n(n-1)!$ $\quad \boxed{n<3}$

$\frac{\cancel{(n-1)!}.12}{\cancel{(n-1)!}} = (n+1)n$

$12 = n^2 + n$

$n^2 + n - 12 = 0$

$\Delta\ 1^2 + 4.1.(-12)$ $\quad V = \{1, 2, 3\}$

$\Delta\ 1 + 48$

$\Delta\ 49$

$n = \frac{-1 \pm 7}{2}$

$n^{I} = \frac{-1-7}{2} = \frac{-8}{2} = -4$ não convém

$n^{II} = \frac{-1+7}{2} = \frac{6}{2} = 3$

SÃO DOMINGOS

4. $\binom{20}{13}+\binom{20}{14}$ $\quad \binom{n+1}{k+1} \quad \binom{21}{14}$

$\binom{n}{k}=\binom{n}{n-k} \quad \underbrace{\binom{21}{14}=\binom{21}{21-14}}$

$\binom{21}{7}$ Resposta: alternativa C

5. $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\dots+\binom{n}{n}$ Soma na linha n $\to$ 2^n

6. a. $\sum_{p=0}^{10}\binom{10}{p} \to \binom{10}{0}+\binom{10}{1}+\binom{10}{2}+\dots+\binom{10}{10}$ Soma na linha 10 $\to 2^{10}=\boxed{1024}$

b. $\sum_{p=0}^{9}\binom{10}{p} \to \binom{10}{0}+\binom{10}{1}+\binom{10}{2}+\dots+\binom{10}{9}$ Soma na linha 10 $\to 2^{10}$

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

$1024-1=1023$

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

Soma na linha 9 $\to 2^9$ $\quad 2^9-\binom{9}{0}-\binom{9}{1}$ $\quad 512-1-9=512-10=502$

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

Soma na coluna 4 $\to \binom{n+1}{k+1}=\binom{11}{5}$

$\binom{11}{5}=\frac{11.10.9.8.7}{5.4.3.2.1}=\frac{55440}{120}=462$

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e. $\sum_{p=5}^{10} \binom{p}{5} \rightarrow \binom{5}{5} + \binom{6}{5} + \binom{7}{5} + \ldots + \binom{10}{5}$

Soma na coluna 5 $\rightarrow \binom{11}{6}$

$\binom{11}{6} = \frac{11.10.9.8.7.6}{6.5.4.3.2.1} = \frac{332640}{720} = 462$

7. $\sum_{k=0}^{m} \binom{m}{k} = 512 \qquad \binom{m}{0} + \ldots + \binom{m}{m} = 512$

Soma na linha $m \rightarrow 2^m$

$2^m = 512$

$2^m = 2^9 \rightarrow m = 9$ Resposta: alternativa E