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Prontuário: **CB1990209**

Disciplina: **Matemática**

IFSP - Câmpus Cubatão

Tarefa Básica 2

Coeficientes Binomiais - Triângulo de Pascal e Tartaglia

(Fotos nas páginas seguintes)

Exercícios 1 e 2:

Tarefa Básica 2

1-) $\binom{8}{3}$ é: $\binom{8}{3} = \frac{8!}{3!(8-3)!} \Rightarrow \frac{8!}{3!\,5!} \Rightarrow \frac{8\cdot 7\cdot 6\cdot \cancel{5!}}{3\cdot 2\cdot 1\cdot \cancel{5!}} \Rightarrow$

$\therefore \frac{336}{6} \Rightarrow \boxed{56} \Rightarrow \boxed{56}$ Letra B

2-) $\binom{200}{198}$ é: $\binom{200}{198} \Rightarrow \frac{200!}{198!\,2!} \Rightarrow \frac{200\cdot 199\cdot \cancel{198!}}{\cancel{198!}\,2\cdot 1} \Rightarrow$

$\therefore \frac{39800}{2} \Rightarrow \boxed{19900}$ → Letra A

Exercício 3:

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

$\frac{(n-1)!}{2!(n-1-2)!} = 0 \Rightarrow \frac{(n-1)(n-2)\cancel{(n-3)!}}{2\cdot 1\,\cancel{(n-3)!}} = 0 \Rightarrow \frac{n^2-2n-n+2}{2} = 0 \therefore$

$\therefore 0{,}5n^2 - 1{,}5n + 1 = 0$ → $\boxed{\frac{1}{1} + \frac{2}{\ } = 3 \quad 1 \cdot 2 = 2}$

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

$\therefore \frac{1}{2} \times \frac{n^2+n}{24} \Rightarrow 2n^2+2n=24 \;(-1)\; -2n^2+2n-24=0 \Rightarrow \frac{3}{3} + \frac{-4}{-4} = -1$; $\frac{3}{3} \cdot \frac{-4}{-4} = -4$; 3 ; -4 (não convém.)

$\boxed{n' = 1;\ n'' = 2 \text{ e } n''' = 3}$

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

Exercícios 4 e 5:

4-) $\binom{20}{13}+\binom{20}{14}$ é:

$\boxed{\cdot}+\boxed{\cdot} \Downarrow \square$

$$\binom{20}{13}+\binom{20}{14}=\binom{20+1}{13+1}=\boxed{\binom{21}{14}}$$

2 consecutivos da linha 20

$$\binom{21}{14}=\binom{21}{7} \longrightarrow \boxed{\begin{matrix}21\\7\end{matrix}}$$

→ Letra C

Complementares ⇒ $14+7=21$

5-) Quanto vale: $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\dots+\binom{n}{n}$?

$\boxed{\text{Soma da linha } n \Rightarrow 2^n}$

Exercícios 6 – A e B:

6-) A-) $\sum_{p=0}^{10} \binom{10}{p}$

$$\binom{10}{0}+\binom{10}{1}+\binom{10}{2}+\binom{10}{3}+\dots\binom{10}{10} = 2^{10} = \boxed{1024}$$

Soma da linha 10 $\Rightarrow$

B-) $$\sum_{p=0}^{9} \binom{10}{p} \Rightarrow \binom{10}{0}+\binom{10}{1}+\binom{10}{2}+\binom{10}{3}+\dots\binom{10}{9}$$

Soma da linha 10 $-\binom{10}{10}$

$$2^{10}-1$$

$$1024-1 \Rightarrow \boxed{1023}$$

Exercícios 6 – C, D e E:

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

Soma da linha 9 $-\binom{9}{0}-\binom{9}{1}$

$2^9 - 1 - 9$

$512-1-9 \Rightarrow \boxed{502}$

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

Soma da coluna 4

$\therefore \binom{4}{4}$

$\binom{5}{4}$

$\dots$

$\binom{10}{4} \Rightarrow \binom{11}{5}$

$\Rightarrow \frac{11!}{5!\,6!} \Rightarrow \frac{11.10.9.8.7.\cancel{6!}}{5.4.3.2.1.\cancel{6!}} \Rightarrow \frac{5544\cancel{0}}{12\cancel{0}} \therefore$

$\therefore \boxed{462}$

E-) $\sum_{p=5}^{10}\binom{p}{5} \Rightarrow \binom{5}{5}+\binom{6}{5}+\dots\binom{10}{5} \Rightarrow \therefore$

$\therefore \binom{5}{5}$

$\binom{6}{5}$

$\dots$

$\binom{10}{5} \Rightarrow \binom{11}{6}$

$\Rightarrow \underbrace{\binom{11}{6}=\binom{11}{5}}_{\text{complementar}}$

pois: $5+6=11$

Então: $\binom{11}{6}=\boxed{462}$

Exercício 7:

7-) O valor de m, que satisfaz a sentença:

$$\sum_{k=0}^{m} \binom{m}{k} = 512 \Rightarrow \binom{m}{0} + \binom{m}{1} + \binom{m}{2} + \dots = 512$$

Como na linha $m = 2^m = 512$

↳ fatorar

$$\begin{array}{r|l} 512 & 2 \\ 256 & 2 \\ 128 & 2 \\ 64 & 2 \\ 32 & 2 \\ 16 & 2 \\ 8 & 2 \\ 4 & 2 \\ 2 & 2 \\ 1 & 2^9 \end{array}$$

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

$$\boxed{m = 9}$$

↳ Letra E