Tarefa Básica

① $\binom{8}{3} = \frac{8!}{3!(8-3)!} = \frac{8!}{3!\,5!} = \frac{8.7.6.\cancel{5!}}{3!\,\cancel{5!}} = \frac{336}{6} = 56$

Alternativa Ⓑ

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

Alternativa Ⓐ

③ $\binom{n-1}{2} = \binom{n+1}{4}$

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

$n \leq 3$ $\quad$ $n \leq 3$

$n > 0$, pois fatorial de número negativo não existe.

$0 < n \leq 3$ então $n = \{1, 2, 3\}$

④ $\binom{20}{13} + \binom{20}{14} = \binom{21}{14} = \binom{21}{7}$ $\binom{21}{14} = \binom{21}{7}$

$14 + 7 = 21$

Alternativa ⓒ são complementares

⑤ Quando a linha é n, a soma dos elementos dessa linha é igual a 2^n.

⑥ a) $\sum_{p=0}^{10} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \binom{10}{2} + \dots \binom{10}{10} = 2^{10} = 1024$

b) $\sum_{p=0}^{9} \binom{10}{p} = \binom{10}{0} + \binom{10}{1} + \dots \binom{10}{9} = 2^{10} - \binom{10}{10} = 1024 - 1 = 1023$

c) $\sum_{p=2}^{9} \binom{9}{p} = \binom{9}{2} + \binom{9}{3} + \dots \binom{9}{9} = 2^{9} - \binom{9}{0} - \binom{9}{1} = 512 - 1 - 9 \Rightarrow$

$\Rightarrow 502$

d) $\sum_{p=4}^{10} \binom{p}{4} = \binom{4}{4} + \binom{5}{4} + \dots \binom{10}{4} = 462$

			④		
④	1	4	6	4	1
5	1	5	10	10	5
6	1	6	15	20	15
7	1	7	21	35	35
8	1		28	56	70
9	1			84	126
10	1			210	

$\} \ 462$

2) $\sum_{p=5}^{10}\binom{p}{5} = \binom{5}{5} + \binom{6}{5} + \dots \binom{10}{5} = 462$

					5		
5	1	5	10	10	5	1	
6	1	6	15	20	15	6	
7			21	35	35	21	
8				56	70	56	462
9					126	126	
10						252	

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

usando a propriedade das linhas, $2^m = 512$. Então $m = 9$. Alternativa E