Aluno: Sabrina Vitória Pereira de Souza Ribeiro CTII350

Lista de exercícios

1. $\binom{8}{3} = \frac{n!}{k!(n-k)!} \rightarrow \frac{8!}{3!(8-3)!} = \frac{8!}{3!\,5!} = \frac{8.7.6.\cancel{5!}}{3!\,\cancel{5!}}$

$= \frac{336}{3.2.1} = \frac{336}{6} = 56 \rightarrow$ alternativa B//

2. $\binom{200}{198} = \frac{200!}{198!(200-198)!} = \frac{200.199.\cancel{198!}}{\cancel{198!}\,2!} = \frac{39800}{2.1}$

$= \frac{39800}{2} = 19900 \rightarrow$ alternativa A//

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

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

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

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

$\frac{(n-1).(n-2)}{2} - \frac{(n+1).n.(n-1).(n-2)}{4.3.2.1} = 0$

$\frac{(n-1).(n-2)}{2} - \frac{(n+1).n.(n-1).(n-2)}{24} = 0$

tilibra

$$\frac{12(n-1).(n-2)-n.(n+1).(n-1).(n-2)}{2^4}=0$$

$$12(n-1).(n-2)-n.(n+1).(n-1).(n-2)=0$$
$$(n-1).(n-2).(12-n.(n+1))=0$$
$$(n-1).(n-2).(-n^2-n+12)=0$$

$n-1=0$ $\quad$ $n-2=0$

$n=1$ // $\quad$ $n=2$ //

$-n^2-n+12$

$\Delta=(-1)^2-4.(-1).12$

$\Delta=1+48$

$\Delta=49$

$n=\frac{-(-1)\pm\sqrt{49}}{2.(-1)}$

$n=\frac{1\pm7}{-2}$

$n'=\frac{1+7}{-2}=\frac{8}{-2}=-4$

$n''=\frac{1-7}{-2}=\frac{-6}{-2}=3$ //

$n=1$

$n=2$

$n=3$

$n=-4 \rightarrow$ não convém

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

4. $\binom{20}{13}+\binom{20}{14}=\binom{21}{14}$ $\quad$ $\binom{k}{n}=\binom{n}{n-k}$ $\rightarrow \binom{21}{14}=\binom{21}{21-14}$

soma na linha 20

$=\binom{21}{7}$ alternativa C //

5. $\binom{n}{0}+\binom{n}{1}+\binom{n}{2}+\ldots+\binom{n}{n}=2^n$

soma na linha

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

$2^{10} = 1024$

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

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

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

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

$2^{9} - \binom{9}{0} - \binom{9}{1}$

$2^9 - 1 - 9$

$512 - 10 = 502$

d) $\sum_{p=4}^{10} \binom{p}{4} = \sum_{p=4}^{10} \frac{p!}{4!(p-4)!} = \frac{4!}{4!(4-4)!} + \frac{5!}{4!(5-4)!} + \frac{6!}{4!(6-4)!}$

$+ \frac{7!}{4!(7-4)!} + \frac{8!}{4!(8-4)!} + \frac{9!}{4!(9-4)!} + \frac{10!}{4!(10-4)!}$

$1 + \frac{5}{1} + \frac{6.5}{2!} + \frac{7.6.5}{3!} + \frac{8.7.6.5}{4!} + \frac{9.8.7.6}{4!}$

$+ \frac{10.9.8.7}{4!}$

$$\frac{(2!\cdot 3.4.5).7 + 2520 + 6720 + 15120 + 30240}{2!\cdot 3.4.5}$$

$$\frac{5!\cdot 7 + 2520 + 6720 + 15120 + 30240}{5!}$$

$$\frac{7.120 + 54600}{120}$$

$$\frac{840 + 54600}{120} = 462$$

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

$$\binom{m}{0} + \binom{m}{1} + \binom{m}{2} + \dots + \binom{m}{m}$$

$$2^m = 512$$

$2^9 = 512$ $m = 9$ alternativa E //