

3º ano - Análise Combinatória

Lista 04

① a) $A_{5,2} = \frac{5!}{(5-2)!} = \frac{5 \cdot 4 \cdot 3!}{3!} = 20 =$

b) $A_{10,3} = \frac{10!}{(10-3)!} = \frac{10!}{7!} = 10 \cdot 9 \cdot 8 = 720 =$

c) $A_{n,n-1} = \frac{n!}{(n-(n-1))!} = \frac{n!}{(1)!} = \frac{n!}{1} = n! =$

② $A_{7,2} = \frac{7!}{5!} = 7 \cdot 6 = 42 =$

③ $A_{4,3} = \frac{4!}{(4-3)!} = 4 \cdot 3 \cdot 2 = 24 =$

④ a) $A_{8,3} = \frac{8!}{(8-3)!} = 8 \cdot 7 \cdot 6 = 336 =$

b) $\frac{1}{B} \cdot 7 \cdot 6 = 42$; ou $A_{7,2} = \frac{7!}{5!} = 7 \cdot 6 = 42 =$

c) Bárbara tem: $7 \cdot 6 \cdot \frac{1}{B \cdot (r)} = 42$

$336 - 42 = 294$

total - (B.r) =

⑤ a) $A_{n,2} = 30$
 $\frac{n!}{(n-2)!} = 30$
 $\frac{n(n-1) \cdot \cancel{(n-2)!}}{\cancel{(n-2)!}} = 30$

$n^2 - n - 30 = 0$

$n = \frac{1 \pm \sqrt{1+120}}{2}$

$n = \frac{1 \pm 11}{2}$

$n' = 6 =$

$n'' = -5$

↳ desconsiderada

5)

$$b) \quad A_{n+1, n-1} = 60 \quad \left| \quad \begin{aligned} (n+1)! &= 120 \\ (n+1)! &= 5! \\ n+1 &= 5 \\ n &= 4 \end{aligned} \right.$$

$$\frac{(n+1)!}{((n+1)-(n-1))!} = 60$$

$$\frac{(n+1)!}{2} = 60$$

6) $5 \cdot 3 \cdot 8 = 120$

8) $A_{10, 3} = \frac{10!}{7!} = 720$

7) $5 \cdot 3 \cdot 2 = 30$

9) $A_{12, 8} = \frac{12!}{4!}$

10) $A_{8, 3} = \frac{8!}{5!}$

11) $A_{10, 4} = \frac{10!}{6!}$

12) a) $P_6 = 6! = 720$

c) $\frac{P_n}{P_{n-2}} = \frac{n!}{(n-2)!} = n(n-1)$

b) $\frac{P_5}{P_3} = \frac{5!}{3!} = 20$

d) $P_3 + P_4 = 3! + 4! = 6 + 24 = 30$

13) a) $P_n = 120$
 $n = 5$

b) $\frac{P_n + P_{n-1}}{P_{n+1}} = \frac{1}{8} \quad \left| \quad \begin{aligned} \frac{n+1}{n(n+1)} &= \frac{1}{8} \\ \frac{1}{n} &= \frac{1}{8} \\ n &= 8 \end{aligned} \right.$

$$\frac{n! + (n-1)!}{(n+1) \cdot n \cdot (n-1)!} = \frac{1}{8}$$

14)

a) $7! = 5040$

b) $6! = 720$

c) 7 letras: 3 conso. 4 vogais $\left\{ \frac{4}{v} \cdot \frac{5}{c} \cdot \frac{4}{v} \cdot \frac{3}{c} \cdot \frac{2}{v} \cdot \frac{1}{c} \cdot \frac{3}{v} = 1440; \right.$

d) $\frac{4}{v} \cdot \frac{5}{c} \cdot \frac{4}{v} \cdot \frac{3}{c} \cdot \frac{2}{v} \cdot \frac{1}{c} \cdot \frac{3}{c} = 1440;$

e) $P_3 = 6$
(JAN)

$\underbrace{\frac{JAN}{5!} \cdot \frac{E}{1!} \cdot \frac{L}{1!} \cdot \frac{O}{1!}}_{5! = 120} \rightarrow 6 \cdot 120 = 720 =$

15)

a) $\frac{A}{1} \cdot \frac{B}{1} \cdot \frac{3}{1} \cdot \frac{2}{1} \cdot \frac{1}{1} = 6 =$

b) $\left. \begin{array}{l} P_2 = 2! = 2 \quad (A|B) \\ P_4 = 4! = 24 \end{array} \right\} 2 \cdot 24 = 48 =$

16)

$\left. \begin{array}{l} A \rightarrow D \\ B \rightarrow E \\ C \rightarrow F \end{array} \right\} 6 \text{ permut.}$

$\frac{2}{A|C} \cdot \frac{4}{1} \cdot \frac{3}{1} \cdot \frac{2}{1} \cdot \frac{1}{1} \cdot \frac{1}{C|A} = 48 \text{ opções com elas nos ext.}$

$P_6 = 6! = 720 - 48 = 672 =$
Total

17)

Nóte: 5 letras; 2 vogais

$P_5 = 120$ (total) $\left| \begin{array}{l} \text{vogais juntas: } P_2 = 2 \\ P_4 = 24 \end{array} \right\} P_4 \cdot P_2 = 48$ (juntas)

R: $120 - 48 = 72 =$

18)

$\frac{3}{\text{Rep.}} \cdot \frac{2}{\text{atlet.}} \cdot \frac{1}{\text{dir.}} = 3! = 6$

(2) (6) (3) $\rightarrow 6 \cdot 2! \cdot 6! \cdot 3! = 6 \cdot 2720 = 51840 =$