



## Anagramas e Limites da forma 0/0

- 1) A partir do conjunto de 7 letras AAABBCC, calcular o número de anagramas de 2 a 7 letras
- 2) Como muda o número de anagramas se queremos pelo menos 2 A e 1 C?
- 3) Calcular os limites para  $x \rightarrow 0$  de

$$\frac{\sin[x^2](1 - \cos[2x^3])}{x(e^{2x^5} - 1)\sin^2[x]} \quad e \quad \frac{\sin^3[e^x - 1](1 - \cos[\sin(2x)])}{x(e^{x^2} - 1)\sin^2[x]}$$





Anagramas de 2 a 7 letras a partir do conjunto: AAA BB CC

$$A(x) = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} = 1 + x + \frac{x^2}{2} + \frac{x^3}{6}$$

$$B(x) = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} = 1 + x + \frac{x^2}{2}$$

$$C(x) = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} = 1 + x + \frac{x^2}{2}$$

$$A(x)B(x)C(x) = 1 + 3x + \frac{9x^2}{2} + \frac{25x^3}{6} + \frac{31x^4}{12} + \frac{13x^5}{12} + \frac{7x^6}{24} + \frac{x^7}{24}$$

$$A(x)B(x)C(x) = 1 + 3x + \frac{9}{2} \frac{2!}{2!} \frac{x^2}{2!} + \frac{25}{6} \frac{3!}{3!} \frac{x^3}{3!} + \frac{31}{12} \frac{4!}{4!} \frac{x^4}{4!} + \frac{13}{12} \frac{5!}{5!} \frac{x^5}{5!} + \frac{7}{24} \frac{6!}{6!} \frac{x^6}{6!} + \frac{7!}{24} \frac{x^7}{7!}$$

$$A(x)B(x)C(x) = 1 + 3x + 9 \frac{x^2}{2!} + 25 \frac{x^3}{3!} + 62 \frac{x^4}{4!} + 130 \frac{x^5}{5!} + 210 \frac{x^6}{6!} + 210 \frac{x^7}{7!}$$

4 letras: BBCC[6] ABCC[12] ABBC[12] AABB[6] AACC[6] AABC[12] AAAB[4] AAAC[4] tot: 62







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pelo menos 2 A e 1 C

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Anagramas de 2 a 7 letras a partir do conjunto: AAA BB CC

$$A(x) = \frac{\cancel{x^0}}{0!} + \frac{\cancel{x^1}}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} = \frac{x^2}{2} + \frac{x^3}{6}$$

$$B(x) = \frac{x^0}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} = 1 + x + \frac{x^2}{2}$$

$$C(x) = \frac{\cancel{x^0}}{0!} + \frac{x^1}{1!} + \frac{x^2}{2!} = x + \frac{x^2}{2}$$

$$A(x)B(x)C(x) = \frac{x^3}{2} + \frac{11x^4}{12} + \frac{3x^5}{4} + \frac{7x^6}{24} + \frac{x^7}{24}$$

$$A(x)B(x)C(x) = \frac{3!}{2} \frac{x^3}{3!} + \frac{11 \cdot 4!}{12} \frac{x^4}{4!} + \frac{3 \cdot 5!}{4} \frac{x^5}{5!} + \frac{7 \cdot 6!}{24} \frac{x^6}{6!} + \frac{7!}{24} \frac{x^7}{7!}$$

$$A(x)B(x)C(x) = 3 \frac{x^3}{3!} + 22 \frac{x^4}{4!} + 90 \frac{x^5}{5!} + 210 \frac{x^6}{6!} + 210 \frac{x^7}{7!}$$

4 letras: ~~BBCC~~[6] ~~A2CC~~[12] ~~ABCC~~[12] ~~AAAB~~[6] AACC[6] AABC[12] ~~AAAB~~[4] AAAC[4] tot: 22



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*fórmulas de equivalência que usaremos para calcular limites da forma 0/0*

$$e^x - 1 \Rightarrow x \qquad \sin[x] \Rightarrow x \qquad 1 - \cos[x] \Rightarrow \frac{x^2}{2}$$

$$1) \frac{\sin[x^2](1 - \cos[2x^3])}{x(e^{2x^5} - 1)\sin^2[x]} \Rightarrow \frac{x^2 \frac{(2x^3)^2}{2}}{x \cdot 2x^5 \cdot x^2} = 1$$

$$2) \frac{\sin^3[e^x - 1](1 - \cos[\sin(2x)])}{x(e^{x^2} - 1)\sin^2[x]} \Rightarrow \frac{x^3 \frac{(2x)^2}{2}}{x \cdot x^2 \cdot x^2} = 2$$

