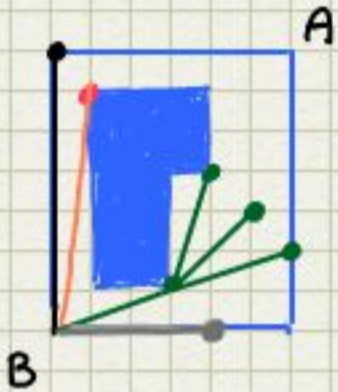


$$\begin{aligned} & \binom{5}{0} \left[ \binom{4}{2} \binom{4}{4} + \binom{4}{3} \binom{4}{3} \right] && 22 \\ & \binom{5}{1} \left[ \binom{4}{1} \binom{4}{4} + \binom{4}{2} \binom{4}{3} \right] && 140 \\ & \binom{5}{2} \left[ \binom{4}{0} \binom{4}{4} + \binom{4}{1} \binom{4}{3} \right] && 170 \\ & \binom{6}{5} \binom{7}{1} && 42 \\ & \binom{6}{6} \binom{7}{0} && 1 \end{aligned}$$

375

PODEMOS TAMBÉM CALCULAR OS CAMINHOS MAIS CURTOS A PARTIR DE



$$\begin{aligned} & \binom{7}{0} \binom{6}{6} && 1 \\ & \binom{7}{1} \binom{6}{5} && 42 \\ & \binom{4}{3} \left[ \binom{4}{1} \binom{5}{2} + \binom{4}{2} \binom{5}{1} + \binom{4}{3} \binom{5}{0} \right] && 296 \\ & \binom{4}{4} \binom{9}{2} && 36 \end{aligned}$$

375

CALCULAR A PROBABILIDADE DE FAZER 16, 17, 18, 19 LANÇANDO 5 DADOS.

FUNÇÃO GERADORA  $(x + x^2 + x^3 + x^4 + x^5 + x^6)^5$

$$x^5 \left( \frac{1-x^6}{1-x} \right)^5 = x^5 \sum_{s=0}^5 \binom{5}{s} (-x)^s \sum_{n=0}^{\infty} \binom{4+n}{n} x^n$$

16 (11)  $s=0$   $n=11$   
1 5  $\binom{5}{0} \binom{15}{11} - \binom{5}{1} \binom{9}{5} = 735$

17 (12)  $s=0$   $n=12$   
1 6 0  $\binom{5}{0} \binom{16}{12} - \binom{5}{1} \binom{10}{6} + \binom{5}{2} \binom{4}{0} = 780$

18 (13)  $s=0$   $n=13$   
1 7 1  $\binom{5}{0} \binom{17}{13} - \binom{5}{1} \binom{11}{7} + \binom{5}{2} \binom{5}{1} = 780$

19 (14)  $s=0$   $n=14$   
1 8 2  $\binom{5}{0} \binom{18}{14} - \binom{5}{1} \binom{12}{8} + \binom{5}{2} \binom{6}{2} = 735$

16, 19  $735 / 6^5$   
 $\sim 9.5\%$

17, 18  $780 / 6^5$   
 $\sim 10\%$

PROBABILIDADE DE FAZER 16 ou 17 ou 18 ou 19  $\sim 39\%$

DADAS 2A, 2B, 2C, 3D QUANTOS ANAGRAMAS DE 4 E 5 LETRAS PODEMOS FORMAR?

DESTES ANAGRAMAS QUANTOS SÃO AQUELES QUE TEM PELO MENOS UMA B, UMA C E UMA D E QUANTOS UMA C E UMA D

FUNÇÃO GERADORA DO PROBLEMA SEM RESTRIÇÕES

$$\left(1 + x + \frac{x^2}{2}\right)^3 \left(1 + x + \frac{x^2}{2} + \frac{x^3}{3!}\right)$$

$$\left(1 + x + \frac{x^2}{2}\right)^2 \left(1 + x + \frac{x^2}{2}\right) \left(1 + x + \frac{x^2}{2} + \frac{x^3}{3!}\right)$$

$$\left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4}\right) \left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4} + \frac{x^3}{3!} + \frac{x^4}{3!} + \frac{x^5}{12}\right)$$

$$\left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4}\right) \left(1 + 2x + 2x^2 + \frac{7}{6}x^3 + \frac{5}{12}x^4 + \frac{x^5}{12}\right)$$

1	x	x <sup>2</sup>	x <sup>3</sup>	x <sup>4</sup>	x <sup>5</sup>	x <sup>6</sup>	x <sup>7</sup>	x <sup>8</sup>	x <sup>9</sup>
1	2	2	7/6	5/12	1/12				
	2	4	4	7/3	5/6	1/6			
		2	4	4	7/3	5/6	1/6		
			1	2	2	7/6	5/12	1/12	
				1/4	1/2	1/2	7/24	5/48	1/48
1	4	8	61/6	9	23/4	8/3	7/8	3/16	1/48

1	1	2	3!	4!	5!	6!	7!	8!	9!
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1	4	16	64	216	690	1920	4410	7560	7560
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FUNÇÃO GERADORA PARA ANAGRAMAS COM PLO MENOS UMA B, UMA C E UMA D

$$\left(1 + x + \frac{x^2}{2}\right) \left(x + \frac{x^2}{2}\right)^2 \left(x + \frac{x^2}{2} + \frac{x^3}{3!}\right)$$

$$\left(1 + x + \frac{x^2}{2}\right) \left(1 + \frac{x}{2}\right)^2 \left(1 + \frac{x}{2} + \frac{x^2}{6}\right) x^3$$

$$\left(1 + x + \frac{x^2}{2}\right) \left(1 + x + \frac{x^2}{4}\right) \left(1 + \frac{x}{2} + \frac{x^2}{6}\right) x^3$$

$$\left(1 + x + \frac{x^2}{2}\right) \left(1 + \frac{x}{2} + \frac{x^2}{6} + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^2}{4} + \frac{x^3}{8} + \frac{x^4}{24}\right) x^3$$

$$\left(1 + x + \frac{x^2}{2}\right) \left(1 + \frac{3}{2}x + \frac{11}{12}x^2 + \frac{7}{24}x^3 + \frac{1}{24}x^4\right) x^3$$

x <sup>3</sup>	x <sup>4</sup>	x <sup>5</sup>	x <sup>6</sup>	x <sup>7</sup>	x <sup>8</sup>	x <sup>9</sup>
1	3/2	11/12	7/24	1/24		
	1	3/2	11/12	7/24	1/24	
		1/2	3/4	11/24	7/48	1/48
1	5/2	35/12	47/24	19/24	3/6	1/48

→ 60 350 ←

FUNÇÃO GERADORA PARA ANAGRAMAS COM FELO 4800S UMA C E UMA D

$$\left(1 + x + \frac{x^2}{2}\right)^2 \left(x + \frac{x^2}{2}\right) \left(x + \frac{x^2}{2} + \frac{x^3}{6}\right)$$

$$\left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4}\right) \left(1 + \frac{x}{2}\right) \left(1 + \frac{x}{2} + \frac{x^2}{6}\right) x^2$$

$$\left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4}\right) \left(1 + \frac{x}{2} + \frac{x^2}{6} + \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{12}\right) x^2$$

$$\left(1 + 2x + 2x^2 + x^3 + \frac{x^4}{4}\right) \left(1 + x + \frac{5}{12}x^2 + \frac{1}{12}x^3\right) x^2$$

$x^2$	$x^3$	$x^4$	$x^5$	$x^6$	$x^7$	$x^8$	$x^9$
1	1	5/12	1/12				
	2	2	5/6	1/6			
		2	2	5/6	1/6		
			1	1	5/12	1/12	
				1/4	1/4	5/48	1/48
1	3	53/12	47/12	9/4	5/6	3/16	1/48

→ 106 470 ←