

## Capítulo 42

### Exercícios básicos

B.1 c. B.2 6. B.3 d. B.4 e. B.5 a. B.6 2.401. B.7 840.  
B.8 5.880. B.9  $x = 40$ . B.10 40 divisores. B.11  $n(A \cup B) = 351$ .  
B.12 b. B.13  $n(B) = 15$ . B.14 240. B.15 144. B.16 b. B.17 45.  
B.18 420. B.19 432.

### Exercícios complementares

C.1 5.000 placas. C.2 b. C.3 32. C.4 75. C.5 36. C.6 e. C.7 e.  
C.8 72. C.9 e. C.10 c. C.11 186. C.12 e. C.13 b. C.14 b.  
C.15  $57^8$ . C.16 c. C.17 c.

## Capítulo 43

### Exercícios básicos

B.1  $(a, b), (b, a), (a, c), (c, a), (a, d), (d, a), (b, c), (c, b), (b, d), (d, b),$   
 $(c, d), (d, c)$ . B.2  $(2, 4, 6), (2, 6, 4), (4, 2, 6), (4, 6, 2), (6, 2, 4), (6, 4, 2),$   
 $(2, 4, 8), (2, 8, 4), (4, 2, 8), (4, 8, 2), (8, 2, 4), (8, 4, 2), (2, 6, 8), (2, 8, 6),$   
 $(6, 2, 8), (6, 8, 2), (8, 2, 6), (8, 6, 2), (4, 6, 8), (4, 8, 6), (6, 4, 8), (6, 8, 4),$   
 $(8, 4, 6), (8, 6, 4)$ . B.3 São arranjos simples os agrupamentos dos itens  
(b) e (d). B.4 a)  $A_{8,3} = 336$ ; b)  $A_{5,4} = 120$ ; c)  $A_{6,6} = 720$ .

B.5 a)  $A_{4,2} = 12$ ; b)  $A_{5,3} = 60$ ; c)  $A_{4,1} = 4$ . B.6  $\forall n, n \in \mathbb{N}, n \geq 6$ .

B.7  $\forall n, n \in \mathbb{N}, n \geq 4$ . B.8 6. B.9 c. B.10 a. B.11 e.

B.12 a) 5.040; b) 12; c) 22; d)  $\frac{1}{6}$ . B.13 a) F; b) F; c) V; d) V; e) F;

f) F; g) V; h) F. B.14 a) 120; b)  $\frac{1}{30}$ ; c) 40; d)  $n$ ; e)  $\frac{1}{n^3 - 3n^2 + 2n}$ ;

f)  $n^2 + 7n + 12$ ; g)  $\frac{1}{n + 3}$ ; h)  $n^2 - 11n + 30$ ; i)  $\frac{1}{n^2 - 7n + 12}$ .

B.15  $S = \{1\}$ . B.16 c. B.17  $S = \{3\}$ . B.18 e. B.19 a.

B.20  $S = \{5\}$ . B.21  $S = \{8\}$ . B.22 b. B.23 2.880. B.24 6.

B.25 36. B.26 a)  $7! = 5.040$ ; b)  $6! = 720$ ; c)  $5! = 120$ ; d)  $4 \cdot 6! = 2.880$ ;  
e)  $3 \cdot 6! = 2.160$ ; f)  $4 \cdot 3 \cdot 5! = 1.440$ ; g)  $4 \cdot 6! + 3 \cdot 6! - 12 \cdot 5! =$   
 $= 3.600$ ; h)  $5! = 120$ ; i)  $3! \cdot 5! = 720$ ; j)  $7! - 3! \cdot 5! = 4.320$ . B.27 c.

B.28 b. B.29  $P_7^{(2,2)} = 1.260$ . B.30  $P_6^{(3,2)} = 60$ . B.31 1.260.

B.32  $P_5^{(2)} = 60$ . B.33  $P_5^{(2,2)} = 30$ . B.34  $P_5 + P_5^{(2)} = 180$ .

B.35  $P_7^{(3,2)} + P_7^{(3,2)} + P_7^{(2,2)} = 2.100$ . B.36  $P_6^{(3,2)} = 180$ . B.37 a) 21;

b) 5; c) 1; d) 9. B.38 102. B.39  $S = \{6\}$ . B.40  $S = \emptyset$ . B.41 a) 36;

b) 84. B.42 a. B.43 35. B.44 d. B.45 a. B.46 a. B.47 b.

B.48 20.

### Exercícios complementares

C.1 d. C.2 c. C.3 a) V; b) F; c) V; d) V; e) F; f) V; g) F. C.4 d.

C.5 b. C.6  $n = 6$ . C.7 a. C.8 e. C.9 c. C.10  $S = \{2\}$ . C.11 a.

C.12 c. C.13 360. C.14 c. C.15 a. C.16 b. C.17 120. C.18 d.

C.19 e. C.20 60. C.21 28. C.22 28. C.23 35. C.24 2.025.

C.25 16. C.26 d. C.27 e. C.28 63. C.29 10. C.30 e. C.31 e.

C.32 150. C.33 d.

## Capítulo 44

### Exercícios básicos

$$\text{B.1 a) } \binom{7}{4} = 35 \text{ e } \binom{7}{3} = 35.$$

$$\text{b) } \binom{n}{p} = \frac{n!}{p!(n-p)!} \text{ e } \binom{n}{n-p} = \frac{n!}{(n-p)!p!}. \text{ Note, por-}$$

tanto, que números binomiais complementares são iguais.

$$\text{B.2 a) } x^6 + 6x^5a + 15x^4a^2 + 20x^3a^3 + 15x^2a^4 + 6xa^5 + a^6;$$

$$\text{b) } 8x^3 + 36x^2 + 54x + 27; \text{ c) } 16x^4 + 32x^3y^2 + 24x^2y^4 + 8xy^6 + y^8.$$

$$\text{B.3 a) } x^5 - 5x^4a + 10x^3a^2 - 10x^2a^3 + 5xa^4 - a^5;$$

$$\text{b) } 16 - 32x^2 + 24x^4 - 8x^6 + x^8; \text{ c) } 8x^{12} - 36x^8y + 54x^4y^2 - 27y^3.$$

$$\text{B.4 } x = 2 \text{ e } y = 1. \text{ B.5 } x = 3 \text{ e } y = 1 \text{ ou } x = 2 \text{ e } y = 4.$$

$$\text{B.6 } E = (2 + 3)^4 = 5^4 = 625. \text{ B.7 } E = (2 + 1)^5 = 3^5 = 243.$$

$$\text{B.8 } E = (2 - 1)^5 = 1^5 = 1. \text{ B.9 b. B.10 c. B.11 6. B.12 28.}$$

$$\text{B.13 a. B.14 e. B.15 e. B.16 180. B.17 } -448x^{10}. \text{ B.18 c.}$$

### Exercícios complementares

$$\text{C.1 a) } x = 7 \text{ ou } x = 2; \text{ b) } x = 2. \text{ C.2 } (3 \cdot 1 - 1)^{10} = 2^{10} = 1.024.$$

$$\text{C.3 } (1 + 1)^8 = 2^8 = 256. \text{ C.4 d. C.5 b. C.6 } 2^n. \text{ C.7 c.}$$

$$\text{C.8 } -21.504. \text{ C.9 } -20.$$

$$\text{C.10 } T = \binom{11}{p} \left(2x^{-\frac{1}{2}}\right)^p x^{11-p} \therefore T = \binom{11}{p} 2^p x^{-\frac{p}{2}} x^{11-p}$$

$$\therefore T = \binom{11}{p} 2^p x^{\frac{22-3p}{2}}. \text{ Fazendo } \frac{22-3p}{2} = 0, \text{ tem-se } p = \frac{22}{3}.$$

Como  $p \notin \mathbb{N}$ , segue-se que não existe  $\binom{11}{p}$ . Logo,

não existe o termo independente de  $x$ . C.11 a. C.12 d. C.13  $160x^9$ .

## Capítulo 45

### Exercícios básicos

$$\text{B.1 c. B.2 } \frac{2}{5}. \text{ B.3 d. B.4 a) } \frac{1}{6}; \text{ b) } \frac{5}{6}; \text{ c) } 0; \text{ d) } \frac{1}{6}; \text{ e) } 1. \text{ B.5 a.}$$

$$\text{B.6 e. B.7 } \frac{1}{36}. \text{ B.8 } \frac{1}{8}. \text{ B.9 } \frac{1}{4}. \text{ B.10 } \frac{3}{8}. \text{ B.11 } \frac{3}{5}.$$

$$\text{B.12 } \frac{35}{76}. \text{ B.13 } \frac{2}{5}. \text{ B.14 } \frac{16}{33}. \text{ B.15 e. B.16 } \frac{3}{4}. \text{ B.17 } \frac{4}{5}.$$

$$\text{B.18 d. B.19 a. B.20 e. B.21 b. B.22 e. B.23 } \frac{3}{7}. \text{ B.24 c.}$$

$$\text{B.25 e. B.26 d. B.27 a) } \frac{8}{243}; \text{ b) } \frac{16}{81}; \text{ c) } \frac{64}{729}. \text{ B.28 a) } \frac{6}{35};$$

$$\text{b) } \frac{18}{35}; \text{ c) } \frac{31}{35}. \text{ B.29 a) } \frac{10}{21}; \text{ b) } \frac{1}{21}; \text{ c) } \frac{20}{21}; \text{ d) } \frac{37}{42}. \text{ B.30 } \frac{1}{12}.$$

$$\text{B.31 a) } \left(\frac{1}{2}\right)^5 = \frac{1}{32}; \text{ b) } 10 \cdot \left(\frac{1}{2}\right)^5 = \frac{5}{16}. \text{ B.32 } \frac{1}{36}. \text{ B.33 d.}$$

$$\text{B.34 a) } \frac{1}{11}; \text{ b) } \frac{5}{22}. \text{ B.35 d.}$$

### Exercícios complementares

$$\text{C.1 c. C.2 b. C.3 a. C.4 a) } C_{48,6} = 12.271.512; \text{ b) } \frac{1}{12.271.512}.$$

$$\text{C.5 } \frac{1}{10.000}. \text{ C.6 I) b; II) a. C.7 } \frac{7}{8}. \text{ C.8 } \frac{4}{13}. \text{ C.9 } \frac{11}{17}.$$

$$\text{C.10 a) } 37%; \text{ b) } 29%. \text{ C.11 } 17%. \text{ C.12 } 3%. \text{ C.13 } \frac{2}{7}. \text{ C.14 } \frac{4}{7}.$$

$$\text{C.15 } \frac{1}{4}.$$

C.16 a)  $E = \{(M, M, M), (M, M, F), (M, F, M), (F, M, M), (F, F, M), (F, M, F), (M, F, F), (F, F, F)\}$

$A = \{(M, M, F), (M, F, M), (F, M, M), (F, F, M), (F, M, F), (M, F, F)\}$

$B = \{(F, F, M), (F, M, F), (M, F, F), (F, F, F)\}$

b) Temos que:

$$P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{\frac{3}{8}}{\frac{4}{8}} = \frac{3}{4} \text{ e}$$

$$P(A) = \frac{6}{8} = \frac{3}{4}$$

Como  $P(A/B) = P(A)$ , concluímos que  $A$  e  $B$  são independentes.

$$\text{C.17 e. C.18 } \left(\frac{1}{5}\right)^{50}. \text{ C.19 } \frac{31}{32}. \text{ C.20 c. C.21 } 50\%.$$