

**Resolução da UFSC**

21) Resposta: 98

**Resolução**

01. **Incorreta.**

$$\frac{2^{3^2}}{2^{2^3}} = \frac{2^9}{2^8} = 2$$

02. **Correta.**

$$3 \cdot 3,2 \cdot 4 \cdot 10^5 \cdot 10^7 = 38,4 \cdot 10^{12} = 3,84 \cdot 10^{13}$$

04. **Incorreta.**

28 divisores 1, 2, 4, 7, 14, 28  
 $1 + 2 + 4 + 7 + 14 = 28$   
 É um número perfeito.

08. **Incorreta.**

$$\frac{x}{1} = \frac{16}{3^2} = \frac{4}{12^2}$$

$$x \cdot y^2 = 16 \cdot 9 = 144$$

$$x \cdot y^2 = 4 \cdot 12^2 = 576$$

16. **Incorreto.**

x: salgado  
 y: doce

$$x = \frac{2}{3}y \Rightarrow y = \frac{3}{2}x$$

$$4x + 6y = 26$$

$$4x + \cancel{6} \cdot \frac{3}{2}x = 26$$

$$13x = 26$$

$$x = 2$$

32. **Correta.**

$$\begin{cases} x + y + z = 15 \quad (-5) \\ 1x + 5y + 10z = 100 \end{cases} \Rightarrow \begin{cases} -5x - 5y - 5z = -75 \\ x + 5y + 10z = 100 \\ \hline -4x + 5z = 25 \\ 5z - 25 = 4x \end{cases}$$

$$x = \frac{5z - 25}{4}$$

y	x
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	5

$$1R\$ = 5$$

$$5R\$ = 1$$

$$10R\$ = \frac{9}{100}$$

64. **Correta.**

$$\begin{array}{cc} d & p \\ 1,1 \uparrow & 70 \downarrow \\ x & 55 \end{array}$$

$$\frac{x}{1,1} = \frac{70}{55} \Rightarrow x = \frac{77}{55}$$

22) Resposta: 18

**Resolução**

01. **Incorreta.**

PONTOS	LEI DE FORMAÇÃO ( $y = ax + b$ )
(0, 400)	$400 = a \cdot 0 + b \Rightarrow b = 400$
(6000, 1000)	$1000 = a \cdot 6000 + b$
	$1000 = 6000a + 400$

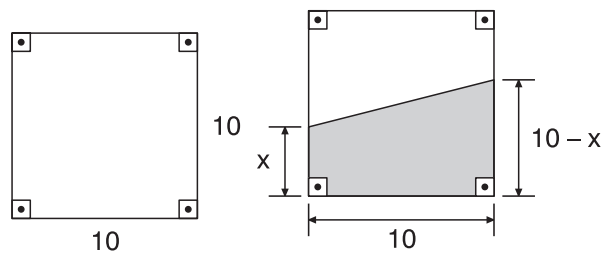
$$a = \frac{600}{6000}$$

$$a = \frac{1}{10}$$

$$y = \frac{1}{10}x + 400$$

A comissão do vendedor é de 10%.

02. **Correta.**



$$A = l^2$$

$$A = 10^2$$

$$A = 100 \text{ cm}^2$$

$$S = \frac{(B + b) \cdot h}{2}$$

$$S = \frac{(10 - x + x) \cdot 10}{2}$$

$$S = 50 \text{ cm}^2$$

04. **Incorreto.**

$$PH = \log \left( \frac{1}{[H^+]} \right)$$

$$PH = \log \left( \frac{1}{2 \cdot 10^{-4}} \right)$$

$$PH = \log (2^{-1} \cdot 10^4)$$

$$PH = \log (2^{-1}) + \log (10^4)$$

$$PH = -1 \log 2 + 4 \log 10$$

$$PH = -1 \cdot (0,3) + 4 \cdot (1)$$

$$PH = 3,7$$

08. **Incorreto.**

x = número de mesas

$$\frac{240}{x} = \frac{240}{x+4} + 2$$

$$240 \cdot (x+4) = 240 \cdot x + 2 \cdot x \cdot (x+4)$$

$$x^2 + 4x - 480 = 0$$

$$x_1 = 20$$

$$x_2 = -24 \text{ (não serve)}$$

16. **Correta.**

O gráfico representa corretamente os dados do texto.

23) **Resposta:** 33

01. **Correta.**

$$a_1 = 4$$

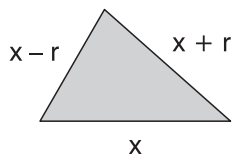
$$r = 3$$

$$a_{100} = a_1 + 99r$$

$$a_{100} = 4 + 99 \cdot 3$$

$$a_{100} = 301$$

02. **Correta.**



$$x-r + x + x+r = 57$$

$$3x = 57$$

$$x = 19$$

$$\text{maior lado: } x+r = 19+2 = 21$$

04. **Incorreta.**

$$2 \text{ horas} = 120 \text{ min.} = 6 \cdot 20 \text{ min}$$

PG

$$a_7 = 2$$

$$q = \frac{1}{2}$$

$$a_7 = a_1 \cdot q^6$$

$$2 = a_1 \cdot \left( \frac{1}{2} \right)^6$$

$$2 = a_1 \cdot \frac{1}{64}$$

$$a_1 = 128$$

08. **Incorreta.**

14 horas

horas exatas

$$S_1 = 2 \cdot (1 + 2 + 3 + \dots + 12) = 2 \cdot \frac{(1+12) \cdot 12}{2} =$$

$$= 13 \cdot 12 = 156$$

A cada meia hora

00:30

01:30

02:30

.

.

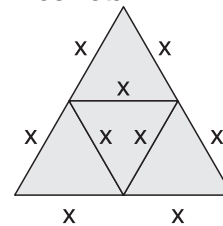
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.11:30

$$\left. \begin{array}{l} 00:30 \\ 01:30 \\ 02:30 \\ \cdot \\ \cdot \\ \cdot \\ .11:30 \end{array} \right\} x2 = 12 \cdot 2 = 24 = S_2$$

$$\text{Total} = 156 + 24 = 180 \text{ badaladas}$$

16. **Incorreta.**



$$l_1 = 2x$$

$$l_2 = x$$

$$\left( \frac{l_1}{l_2} \right)^2 = \frac{A_1}{A_2}$$

$$\left( \frac{2x}{x} \right)^2 = \frac{A_1}{A_2}$$

$$4 = \frac{A_1}{A_2}$$

$$A_1 = 4 \cdot A_2$$

$$A_2 = \frac{A_1}{4}$$

$$A_1 + A_2 + A_3 + \dots$$

$$A + \frac{A}{4} + \frac{A}{16} + \dots$$

PG

$$a_1 = A$$

$$q = \frac{1}{4}$$

$$S_\infty = \frac{A}{1 - \frac{1}{4}} = \frac{A}{\frac{3}{4}} = \frac{4A}{3}$$

$$S_\infty = \frac{4A}{3}$$

32. **Correta.**

$$x^3 - 12x^2 + 44x - 48 = 0$$

$$x_1 + x_2 + x_3 = \frac{-b}{a} = \frac{-(-12)}{1} = 12$$

24) Resposta: 10

**Resolução**

01. **Incorreta.**

$$p(B) = \frac{4}{12} = \frac{1}{3}$$

02. **Correta.**

$$\boxed{K} \quad \boxed{1, 2, 3}$$

$$\frac{1}{2} \times \frac{1}{2} = \frac{1}{4} = 0,25 = 25\%$$

04. **Incorreta.**

$$1^{\text{a}} \text{ senha: } \boxed{\phantom{0}} \boxed{\phantom{0}} \boxed{\phantom{0}} \boxed{\phantom{0}} \\ 10 \cdot 9 \cdot 8 \cdot 7 = 5040$$

$$2^{\text{a}} \text{ senha: } \boxed{\phantom{0}} \boxed{\phantom{0}} \\ 25 \cdot 25 = 650$$

$$5040 + 650 = 5690$$

08. **Correta.**

$$\begin{array}{ccc} A = 10 & B = 8 & C = 4 \\ \boxed{A} \boxed{A} & \boxed{B} \boxed{B} & \boxed{C} \\ \underbrace{\phantom{\boxed{A} \boxed{A}}} & \underbrace{\phantom{\boxed{B} \boxed{B}}} & \underbrace{\phantom{\boxed{C}}} \\ C_{10,2} \times C_{8,2} \times C_{4,1} = \\ = 45 \times 28 \times 4 = \\ = 5040 \end{array}$$

16. **Incorreta.**

$$\boxed{SP} \boxed{PR} \boxed{SC} \boxed{RS} \\ 3 \cdot 2 \cdot 2 \cdot 1 = 12$$

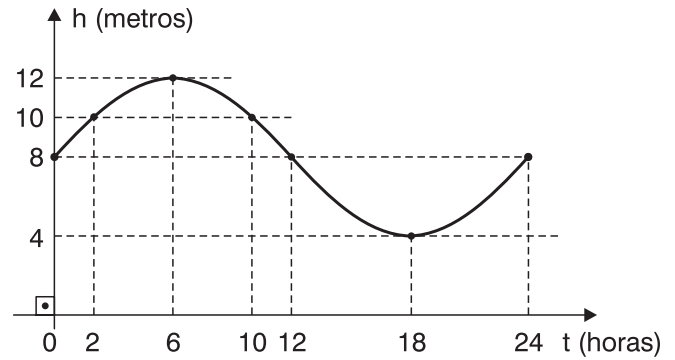
25) Resposta: 29

**Resolução**

$$\begin{cases} M + R = 1490 \\ R + F = 1750 \\ F + M = 840 \end{cases}$$

$$\begin{cases} M - F = -260 \\ M + F = 840 \end{cases} \Rightarrow \frac{M}{2M = 580} = \frac{M}{10} = \frac{290}{10} = 29 \\ M = 290$$

26) Resposta: 12



$$h(t) = 8 = 4 \operatorname{sen}\left(\frac{\pi}{12}t\right)$$

$$P = \frac{2\pi}{\frac{\pi}{12}} = 24$$

$$Im = [8 - 4, 8 + 4] = [4, 12]$$

01. **Incorreta.** O valor mínimo atingido pela maré baixa é 4 m.

02. **Incorreta.** O momento do dia em que ocorre a maré baixa é as 18 h.

04. **Correta.**  $p = 24$

08. **Correta.**  $10 = 8 + 4\operatorname{sen}\left(\frac{\pi}{12}t\right)$

$$\operatorname{sen}\left(\frac{\pi}{12}t\right) = \frac{1}{2}$$

$$\frac{\pi}{12}t = \frac{\pi}{6}$$

$$t = 2$$

ou

$$\frac{\pi}{12}t = \frac{5\pi}{6}$$

27) Resposta: 03

**Resolução**

$$C_x = \begin{pmatrix} 6 & 4 \\ -6 & 9 \\ 2 & 0 \end{pmatrix}$$

01. **Correta.**

$$z = 0$$

$$\begin{pmatrix} 7 & 2 \\ -6 & 3 \\ 2 & 0 \end{pmatrix}_{3 \times 2} X_{2 \times 1} = \begin{pmatrix} 6 & 4 \\ -6 & 9 \\ 2 & 0 \end{pmatrix}_{3 \times 1}$$

$$\begin{pmatrix} 7 & 2 \\ -6 & 3 \\ 2 & 0 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 6 & 4 \\ -6 & 9 \\ 2 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 7a & +2b \\ -6a & +3b \\ 2a \end{pmatrix} = \begin{pmatrix} 6 & 4 \\ -6 & 9 \\ 2 & 0 \end{pmatrix}$$

$$\begin{cases} 7a + 2b = 64 \\ -6a + 3b = -69 \\ 2a = 20 \end{cases}$$

$$\begin{aligned} a &= 10 \\ 7 \cdot 10 + 2b &= 64 \\ 2b &= -6 \\ b &= -3 \\ a + b &= 10 - 3 = 7 \end{aligned}$$

02. **Correta.**

A inversível  $\Leftrightarrow \det A \neq 0$

$$\begin{vmatrix} 0 & x & 1 \\ y & -1 & 0 \\ 1 & z & 0 \end{vmatrix} \neq 0$$

$$\begin{aligned} yz + 1 &\neq 0 \\ yz &\neq -1 \end{aligned}$$

04. **Incorreta.**

$$B^t = \begin{vmatrix} -1 & y & 1 \\ 1 & 0 & x \end{vmatrix}$$

08. **Incorreta.**

$$AB = C$$

$$\begin{vmatrix} 0 & x & 1 \\ y & -1 & 0 \\ 1 & z & 0 \end{vmatrix} \begin{vmatrix} -1 & 1 \\ y & 0 \\ 1 & x \end{vmatrix} = \begin{vmatrix} 7 & 2 \\ -6 & 3 \\ 2 & z \end{vmatrix}$$

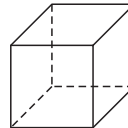
$$\begin{vmatrix} xy + 1 & x \\ -y - y & y \\ -1 + yz & 1 \end{vmatrix} = \begin{vmatrix} 7 & 2 \\ -6 & 3 \\ 2 & z \end{vmatrix}$$

$$\begin{aligned} x &= 2 & y &= 3 & z &= 1 \\ x + y + z &= 6 \end{aligned}$$

28) **Resposta: 20**

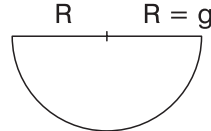
**Resolução**

01. **Incorreta.**



$$\begin{aligned} V &= a^3 \\ V &= (2a)^3 \\ V &= 8a^3 \end{aligned}$$

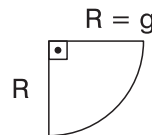
02. **Incorreta.**



$$\alpha = \frac{2\pi r}{g}$$

$$\cancel{\pi} = \frac{2\cancel{\pi} \cdot r}{g}$$

$$g = 2r$$



$$\alpha = \frac{2\pi r}{g}$$

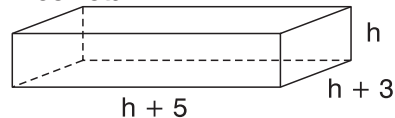
$$\frac{\cancel{\pi}}{2} = \frac{2 \cdot \cancel{\pi} \cdot r}{g}$$

$$g = 4r$$

04. **Correta.**

$$\begin{aligned} A &= 4 \cdot \pi \cdot r^2 \\ A &= 4 \cdot \pi \cdot 2^2 \\ A &= 16\pi \end{aligned}$$

08. **Incorreta.**



$$V = 144$$

$$h \cdot (h + 3) \cdot (h + 5) = 144$$

$$(h^2 + 3h) \cdot (h + 5) = 144$$

$$h^3 + 5h^2 + 3h^2 + 15h - 144 = 0$$

$$h^3 + 8h^2 + 15h - 144 = 0$$

Pelo método da pesquisa de raízes

$$h = 2 \Rightarrow 8 + 32 + 30 - 144 \neq 0 \Rightarrow -74 \neq 0$$

$$h = 3 \Rightarrow 27 + 72 + 45 - 144 = 0 \Rightarrow 0 = 0$$

16. **Correta.**

$$4F_3 = 12$$

$$3F_4 = 12$$

$$F = 7 \quad 24$$

$$A = 12$$

$$V + F = A + 2$$

$$V + 7 = 12 + 2$$

$$V = 7$$

29) **Resposta:** 17

### Resolução

01. **Correta.**

$$y = ax^2 + bx + c$$

$$(0, 1000) \Rightarrow 1000 = 0 + 0 + c \Rightarrow c = 1000$$

$$(20, 1200) \Rightarrow 1200 = 400a + 20b + 1000$$

$$(50, 0) \Rightarrow 0 = 2500a + 50b + 1000$$

$$\begin{cases} a = -1 \\ b = 30 \end{cases}$$

$$f(t) = -t^2 + 30t + 1000$$

02. **Incorreta.** O número inicial é 1000.

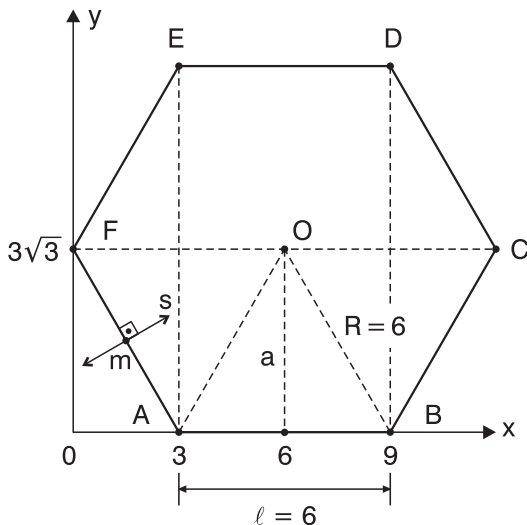
04. **Incorreta.** O 10º dia ao 15º ainda cresce.

08. **Incorreta.** No 20º dia a população é de 1200.

16. **Correta.** Para  $t = 50$  tem-se  $f(t) = 0$ .

30) **Resposta:** 09

### Resolução



01. **Correta.**

$$\overline{AF} \Rightarrow \begin{vmatrix} 3 & 0 & x & 3 \\ 0 & 3\sqrt{3} & y & 0 \end{vmatrix} = 0$$

$$9\sqrt{3} - 3\sqrt{3}x - 3y = 0 \quad (+3)$$

$$\sqrt{3}x + y - 3\sqrt{3} = 0$$

02. **Incorreta.**

$$A_{HR} = 6 \cdot \frac{\ell^2 \sqrt{3}}{4} = 6 \cdot \frac{6^2 \sqrt{3}}{4} = 54\sqrt{3}$$

04. **Incorreta.**

$$A(3, 0) \Rightarrow \left( \frac{3}{2}, \frac{3\sqrt{3}}{2} \right)$$

$$F(0, 3\sqrt{3})$$

$$m_{AF} = \frac{3\sqrt{3} - 0}{0 - 3} = \frac{3\sqrt{3}}{-3} = -\sqrt{3}$$

$$m_{AF} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$y - y_m = m_s (x - x_m)$$

$$y - \frac{3\sqrt{3}}{2} = \frac{\sqrt{3}}{3} \left( x - \frac{3\sqrt{3}}{2} \right)$$

$$3y - \frac{9\sqrt{3}}{2} = \sqrt{3}x - \frac{3\sqrt{3}}{2}$$

$$6y - 9\sqrt{3} = 2\sqrt{3}x - 3\sqrt{3}$$

$$2\sqrt{3}x - 6y + 6\sqrt{3} = 0 \quad (+2)$$

$$\sqrt{3}x - 3y - 3\sqrt{3} = 0$$

08. **Correta.**

$$C(6, 3\sqrt{3})$$

$$R = 6$$

$$x^2 + y^2 - 2x_0y - 2y_0y + x_0^2 + y_0^2 - R^2 = 0$$

$$x^2 + y^2 - 12x - 6\sqrt{3}y + 27 = 0$$

16. **Incorreta.**

$$a = \frac{\ell\sqrt{3}}{2} = \frac{6\sqrt{3}}{2} = 3\sqrt{3}$$