01) $\log_2 x + \log_4 y = 1$

$\log_2 x + \frac{\log_2 y}{\log_2 4} = 1$

$\log_2 x + \frac{\log_2 y}{2} = 1$

$2 \cdot \log_2 x + \log_2 y = 2$

$\log_2 (x^2 \cdot y) = 2$

$x^2 \cdot y = 4$

$y = \frac{4}{x^2}$ $\rightarrow$

$y = \frac{4}{\left(\sqrt[3]{16/9}\right)^2}$

$y = \frac{4}{\sqrt[3]{(4/3)^4}}$

$y = \frac{4}{4/3 \cdot \sqrt[3]{4/3}}$

$y = \frac{3}{\sqrt[3]{4/3}} \cdot \frac{\sqrt[3]{(4/3)^2}}{\sqrt[3]{(4/3)^2}} \Rightarrow y = \frac{9}{4} \cdot \sqrt[3]{\frac{16}{9}}$

$\log_9 x + \log_3 y = 1$

$\frac{\log_3 x}{\log_3 9} + \log_3 y = 1$

$\frac{\log_3 x}{2} + \log_3 y = 1$

$\log_3 x + 2 \cdot \log_3 y = 2$

$\log_3 (x \cdot y^2) = 2$

$x \cdot \left(\frac{4}{x^2}\right)^2 = 9$

$\frac{16}{x^3} = 9$

$x = \sqrt[3]{\frac{16}{9}}$

$S = \left\{\left(\sqrt[3]{\frac{16}{9}}, \frac{9}{4} \cdot \sqrt[3]{\frac{16}{9}}\right)\right\}$

02) $9x^2 - 16(y-1)^2 = 144$

$\frac{9x^2}{144} - \frac{16(y-1)^2}{144} = \frac{144}{144}$

$\frac{x^2}{16} - \frac{(y-1)^2}{9} = 1$

C(0, 1)

$a^2 = 16$, $a = 4$ } eixo real // eixo x

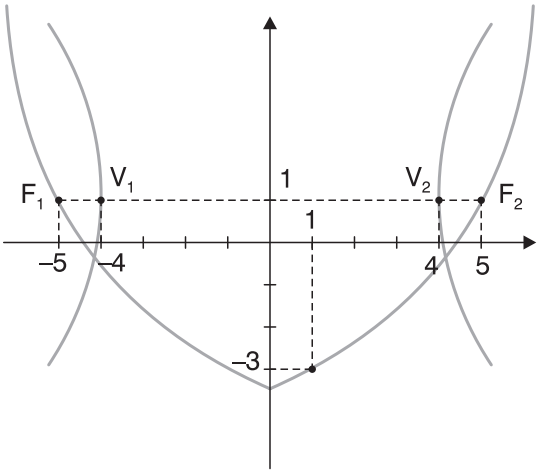
$b^2 = 9$, $b = 3$

$c^2 = a^2 + b^2$

$c^2 = 16 + 9$

$c^2 = 25$

$c = 5$



$F_1(-5, 1)$

$F_2(5, 1)$

$e = \frac{c}{a}$

$e = \frac{5}{4} = R$

A parábola que passa pelos pontos $F_1(-5, 1)$; $F_2(5, 1)$ e $P(1, -3)$

$y = ax^2 + bx + c$

$(-5, 1) \Rightarrow 1 = 25a - 5b + c \quad (-1)$

$(5, 1) \Rightarrow 1 = 25a + 5b + c$

$(1, -3) \Rightarrow -3 = a + b + c$

$-1 = -25a + 5b - c$

$1 = 25a + 5b + c$ +

$0 = 0 + 10b$

$10b = 0$

$b = 0$

$(5, 1) \Rightarrow 1 = 25a + c$

$(1, -3) \Rightarrow -3 = a + c \quad (-1)$

$4 = 24a$ $\qquad -3 = a + c$

$a = \frac{1}{6}$ $\qquad -3 = \frac{1}{6} + c$

$c = -3 - \frac{1}{6}$

$c = -\frac{19}{6}$

$y = ax^2 + by + c$

$\left.\begin{array}{l} a = \frac{1}{6} \\ b = 0 \\ c = -\frac{19}{6} \end{array}\right\}$ $\qquad y = \frac{x^2}{6} - \frac{19}{6}$

$x_v = \frac{-b}{2a}$ $\qquad y_v = \frac{-\Delta}{4a}$

$x_v = 0$ $\qquad y_v = \frac{-19}{6}$

$V\left(0, \frac{-19}{6}\right)$

Circunferência

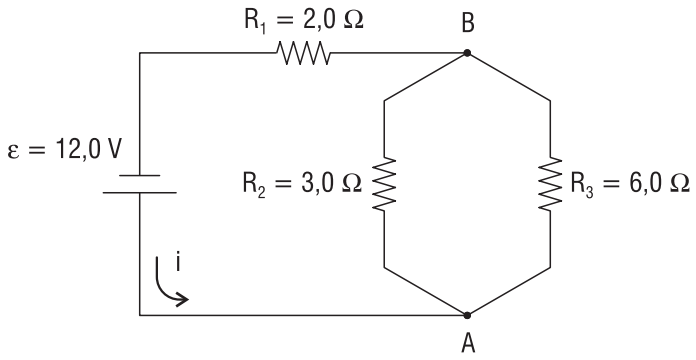
$C\left(0, \frac{-19}{6}\right)$

$R = \frac{5}{4}$

$(x - x_c)^2 + (y - y_c)^2 = R^2$

$x^2 + \left(y + \frac{19}{6}\right)^2 = \frac{25}{16}$

03)



a) $R_{EQ} = R_1 + R_{23}$

$R_{EQ} = R_1 + \frac{R_2 \cdot R_3}{R_2 + R_3}$ $\qquad i = \frac{\varepsilon}{R_{EQ}}$

$R_{EQ} = 2,0 + \frac{3,0 \cdot 6,0}{3,0 + 6,0}$ $\qquad i = \frac{12,0}{4,0}$

$R_{EQ} = 4,0\ \Omega$ $\qquad i = 3,0\ A$

b) $P_{R_1} = R_1 \cdot i^2$

$P_{R_1} = 2,0 \cdot (3,0)^2$

$P_{R_1} = 18\ W$

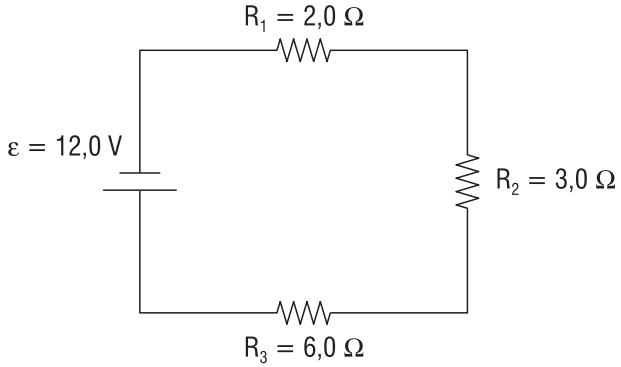
$V_{AB} = R_{23} \cdot i$

$V_{AB} = 2,0 \cdot 3,0 \rightarrow V_{AB} = 6,0\ V$

$P_{R_2} = \frac{V_{AB}^2}{R_2} \rightarrow P_{R_2} = \frac{(6,0)^2}{3,0}$

$P_{R_2} = 12\ W$

c)



$R_{EQ} = R_1 + R_2 + R_3 \rightarrow R_{EQ} = 11\ \Omega$

$P = \frac{\varepsilon^2}{R_{EQ}} \rightarrow P = \frac{(12,0)^2}{11}$

$P = 13,1\ W$

04) a) $\phi_E = \phi_B$

$A_E \cdot V_E = A_B \cdot V_B$

$\pi r_E^2 \cdot V_E = \pi r_B^2 \cdot V_B$

$1{,}1^2 \cdot 10^{-4} \cdot 1 = 0{,}55^2 \cdot 10^{-4} \cdot V$

$V = 4\,m/s$

b) $\phi_B = A_B \cdot V_B$

$\phi_B = \pi r_B^2 \cdot V_B$

$\phi_B = 3 \cdot 0{,}55^2 \cdot 4$

$\phi_B = 3{,}63\ m^3/s$

c) $P_E + \mu gh + \frac{\mu V_E^2}{2} = P_o + \mu gh + \frac{\mu V_B^2}{2}$

$5 \cdot 10^4 + 1 \cdot 10^3 \cdot 10 \cdot 0 + \frac{1 \cdot 10^3 \cdot 1}{2} = P_B + 1 \cdot 10^3 \cdot 10 \cdot 4 + \frac{1 \cdot 10^3 \cdot 4^2}{2}$

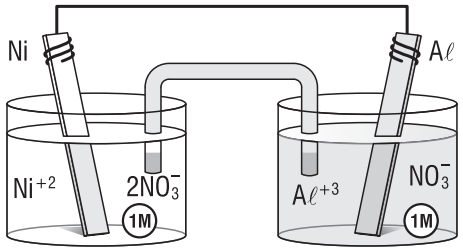
$5{,}05 \cdot 10^4 = P_B + 4 \cdot 10^4 + 0{,}8 \cdot 10^4$

$5{,}05 \cdot 10^4 = P_B + 4{,}8 \cdot 10^4$

$P_B = 5{,}05 \cdot 10^4 - 4{,}8 \cdot 10^4$

$P_B = 2{,}5 \cdot 10^3\ N/m^2$

05)



a) $2\,A\ell \rightarrow 2\,A\ell^{+3} + 2 \times 3\,e^-$ $\quad E = +1{,}66\ V$

$3\,Ni^{+2} + 3 \times 2\,e^- \rightarrow 3\,Ni$ $\quad E = -0{,}23\ V$

$2\,A\ell + 3\,Ni^{+2} \rightarrow 3\,Ni + 2\,A\ell^{+3}$ $\quad \Delta E = +1{,}43\ V$

b) O ânodo é o eletrodo de alumínio, e o cátodo é o eletrodo de níquel.
A polaridade do eletrodo de níquel é negativa.

c) O potencial-padrão da pilha é 1,43 V.

d) O fluxo de elétrons é do eletrodo de alumínio para o eletrodo de níquel.

06) a) $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ $\quad \Delta H^0 = -393{,}5\ kJ$

$d = \frac{m}{V}$

$1{,}5\ g/cm^3 = \frac{m_1}{210\ cm^3}$

$m_1 = 315\ g$

12 g C _____ 393,5 kJ
315 g de C _____ x

$x = 10329{,}4\ kJ$

b) $Q = m \cdot c \cdot \Delta T$
$10329{,}4\ kJ = m \cdot 4{,}18\ kJ/kg \cdot {}^oC \cdot 85\ {}^oC$
$m = 29\ kg$