

R000) RESPOSTAS

R001)

$$a=1 \quad b=-5 \quad c=0$$

$$\Delta = (-5)^2 - 4 \cdot 1 \cdot 0 = 25 - 0 = 25$$

$$x = \frac{-(-5) \pm \sqrt{25}}{2 \cdot 1} = \frac{5 \pm 5}{2} = 0$$

$$S = \{x \in \mathbb{R} / x_1 = x_2 = 0\}$$

R002)

$$a=1 \quad b=-8 \quad c=12$$

$$\Delta = (-8)^2 - 4 \cdot 1 \cdot 12 = 64 - 48 = 16$$

$$x = \frac{-(-8) \pm \sqrt{16}}{2 \cdot 1} = \frac{8 \pm 4}{2} \quad \begin{cases} \frac{8+4}{2} = \frac{12}{2} = 6 \\ \frac{8-4}{2} = \frac{4}{2} = 2 \end{cases}$$

$$S = \{x \in \mathbb{R} / x_1 = 6 \text{ e } x_2 = 2\}$$

R003)

$$a=1 \quad b=2 \quad c=-8$$

$$\Delta = 2^2 - 4 \cdot 1 \cdot (-8) = 4 + 32 = 36$$

$$x = \frac{-2 \pm \sqrt{36}}{2 \cdot 1} = \frac{-2 \pm 6}{2} \quad \begin{cases} \frac{-2+6}{2} = \frac{4}{2} = 2 \\ \frac{-2-6}{2} = \frac{-8}{2} = -4 \end{cases}$$

$$S = \{x \in \mathbb{R} / x_1 = 2 \text{ e } x_2 = -4\}$$

R004)

$$a=1 \quad b=-5 \quad c=8$$

$$\Delta = (-5)^2 - 4 \cdot 1 \cdot 8 = 25 - 32 = -7$$

$$\Delta < 0$$

$$S = \emptyset$$

R005)

$$a=2 \quad b=-8 \quad c=8$$

$$\Delta = (-8)^2 - 4 \cdot 2 \cdot 8 = 64 - 64 = 0$$

$$x = \frac{-(-8) \pm \sqrt{0}}{2 \cdot 2} = \frac{8}{4} = 2$$

$$S = \{x \in \mathbb{R} \mid x_1 = x_2 = 2\}$$

R006)

$$a=1 \quad b=-4 \quad c=-5$$

$$\Delta = (-4)^2 - 4 \cdot 1 \cdot (-5) = 16 + 20 = 36$$

$$x = \frac{-(-4) \pm \sqrt{36}}{2 \cdot 1} = \frac{4 \pm 6}{2} \begin{cases} \frac{4+6}{2} = \frac{10}{2} = 5 \\ \frac{4-6}{2} = \frac{-2}{2} = -1 \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x_1 = 5 \text{ e } x_2 = -1\}$$

R007)

$$\begin{aligned}
 a &= 3 \quad b = -2 \quad c = -8 \\
 \Delta &= (-2)^2 - 4 \cdot 3 \cdot (-8) \\
 \Delta &= 4 + 96 = 100 \\
 x &= \frac{-(-2) \pm \sqrt{100}}{2 \cdot 3}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{2 \pm 10}{6} \\
 x_1 &= \frac{2+10}{6} = \frac{12}{6} = 2 \\
 x_2 &= \frac{2-10}{6} = -\frac{8}{6} = -\frac{4}{3}
 \end{aligned}
 \right.$$

$$S = \left\{ x \in \mathbb{R} \mid x = 2 \text{ ou } x = -\frac{4}{3} \right\}$$

R008)

$$\begin{aligned}
 2x^2 + x - 9 - 2 - 3x + 11 &= 0 \\
 2x^2 + x - 3x - 9 - 2 + 11 &= 0 \\
 2x^2 - 2x &= 0 \\
 x(2x - 2) &= 0 \quad \left\{ \begin{array}{l} x = 0 \\ 2x - 2 = 0 \\ 2x = 2 \\ x = \frac{2}{2} \\ x = 1 \end{array} \right.
 \end{aligned}$$

$$S = \{ x \in \mathbb{R} \mid x = 0 \text{ ou } x = 1 \}$$

R009)

$$\begin{aligned}
 12x - 7 - 7x^2 - 3x - 9x &= 0 \\
 -7x^2 + 12x - 3x - 9x - 7 &= 0 \\
 -7x^2 - 7 &= 0 \\
 -7x^2 &= 7 \cdot (-1) \\
 7x^2 &= -7 \\
 x^2 &= \frac{-7}{7} = -1 \\
 x^2 &= -1
 \end{aligned}$$

$$S = \emptyset$$

R010)

$$\begin{aligned}
 a &= -1 \quad b = 1 \quad c = 12 \\
 \Delta &= 1^2 - 4 \cdot (-1) \cdot 12 = \\
 \Delta &= 1 + 48 = 49 \\
 x &= \frac{-1 \pm \sqrt{49}}{2 \cdot (-1)} =
 \end{aligned}
 \left. \vphantom{\begin{aligned} a &= -1 \quad b = 1 \quad c = 12 \\ \Delta &= 1^2 - 4 \cdot (-1) \cdot 12 = \\ \Delta &= 1 + 48 = 49 \\ x &= \frac{-1 \pm \sqrt{49}}{2 \cdot (-1)} = \end{aligned}} \right\} x = \frac{+1 \pm 7}{2} = \begin{cases} \frac{1+7}{2} = \frac{8}{2} = 4 \\ \frac{1-7}{2} = \frac{-6}{2} = -3 \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x = 4 \text{ ou } x = -3\}$$

R011)

$$\begin{aligned}
 a &= -1 \quad b = 6 \quad c = -5 \\
 \Delta &= 6^2 - 4 \cdot (-1) \cdot (-5) = \\
 \Delta &= 36 - 20 = 16 \\
 x &= \frac{-6 \pm \sqrt{16}}{2 \cdot (-1)} =
 \end{aligned}
 \left. \vphantom{\begin{aligned} a &= -1 \quad b = 6 \quad c = -5 \\ \Delta &= 6^2 - 4 \cdot (-1) \cdot (-5) = \\ \Delta &= 36 - 20 = 16 \\ x &= \frac{-6 \pm \sqrt{16}}{2 \cdot (-1)} = \end{aligned}} \right\} x = \frac{+6 \pm 4}{2} = \begin{cases} \frac{6+4}{2} = \frac{10}{2} = 5 \\ \frac{6-4}{2} = \frac{2}{2} = 1 \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x = 5 \text{ ou } x = 1\}$$

R012)

$$\begin{aligned}
 a &= 6 \quad b = 1 \quad c = -1 \\
 \Delta &= 1^2 - 4 \cdot 6 \cdot (-1) = \\
 \Delta &= 1 + 24 = 25 \\
 x &= \frac{-1 \pm \sqrt{25}}{2 \cdot (6)} =
 \end{aligned}
 \left. \vphantom{\begin{aligned} a &= 6 \quad b = 1 \quad c = -1 \\ \Delta &= 1^2 - 4 \cdot 6 \cdot (-1) = \\ \Delta &= 1 + 24 = 25 \\ x &= \frac{-1 \pm \sqrt{25}}{2 \cdot (6)} = \end{aligned}} \right\} x = \frac{+1 \pm 5}{2} = \begin{cases} \frac{1+5}{2} = \frac{6}{2} = 3 \\ \frac{1-5}{2} = \frac{-4}{2} = -2 \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x = 3 \text{ ou } x = -2\}$$

R013)

$$\begin{aligned}
 a &= 3 \quad b = -7 \quad c = 2 \\
 \Delta &= (-7)^2 - 4 \cdot 3 \cdot 2 \\
 \Delta &= 49 - 24 = 25 \\
 x &= \frac{-(-7) \pm \sqrt{25}}{2 \cdot 3}
 \end{aligned}
 \quad \left| \quad x = \frac{7 \pm 5}{6} = \begin{cases} \frac{7+5}{2} = \frac{12}{2} = 6 \\ \frac{7-5}{2} = \frac{2}{2} = 1 \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x = 6 \text{ ou } x = 1\}$$

R014)

$$\begin{aligned}
 2x^2 - 7x - 15 &= 0 \\
 a &= 2 \quad b = -7 \quad c = -15 \\
 \Delta &= (-7)^2 - 4 \cdot 2 \cdot (-15) = \\
 \Delta &= 49 + 120 = 169 \\
 x &= \frac{-(-7) \pm \sqrt{169}}{2 \cdot 2}
 \end{aligned}
 \quad \left| \quad x = \frac{7 \pm 13}{4} = \begin{cases} \frac{7+13}{4} = \frac{20}{4} = 5 \\ \frac{7-13}{4} = \frac{-6}{4} = -\frac{3}{2} \end{cases}$$

$$S = \{x \in \mathbb{R} \mid x = 5 \text{ ou } x = -\frac{3}{2}\}$$

R015)

$$\begin{aligned}
 4x^2 + 9 - 12x &= 0 \\
 4x^2 - 12x + 9 &= 0 \\
 a=4 \quad b=-12 \quad c=9 \\
 \Delta &= (-12)^2 - 4 \cdot 4 \cdot 9 \\
 \Delta &= 144 - 144 = 0
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{-(-12) \pm 0}{2 \cdot 4} = \frac{12}{8} = \frac{3}{2}
 \end{aligned}
 \right.$$

$$S = \left\{ x \in \mathbb{R} \mid x = \frac{3}{2} \right\}$$

R016)

$$\begin{aligned}
 x^2 - x - 12 &= 0 \\
 a=1 \quad b=-1 \quad c=-12 \\
 \Delta &= (-1)^2 - 4 \cdot 1 \cdot (-12) \\
 \Delta &= 1 + 48 = 49
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{1 \pm 7}{2} = \begin{cases} \frac{1+7}{2} = \frac{8}{2} = 4 \\ \frac{1-7}{2} = \frac{-6}{2} = -3 \end{cases} \\
 S &= \{ x \in \mathbb{R} \mid x=4 \text{ ou } x=-3 \}
 \end{aligned}
 \right.$$

$$x = \frac{-(-1) \pm \sqrt{49}}{2 \cdot 1} =$$

R017)

$$\begin{aligned}
 2x^2 + 12x + 18 &= 0 \\
 \text{DIVIDINDO TUDO POR 2:} \\
 x^2 + 6x + 9 &= 0 \\
 \Delta &= 6^2 - 4 \cdot 9 = \\
 \Delta &= 36 - 36 = 0 \\
 \Delta &= 0
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{-6 \pm \sqrt{0}}{2} = \frac{-6}{2} = -3 \\
 S &= \{ x \in \mathbb{R} \mid x = -3 \}
 \end{aligned}
 \right.$$

R018)

$$x^2 - 4x + 9 = 0$$

$$a=1 \quad b=-4 \quad c=9$$

$$S = \emptyset$$

$$\Delta = (-4)^2 - 4 \cdot 1 \cdot 9$$

$$\Delta = 16 - 36 = -20$$

$$\Delta < 0 \Rightarrow \emptyset$$

R019)

$$25x^2 - 20x + 4 = 0$$

$$a=25 \quad b=-20 \quad c=4$$

$$\Delta = (-20)^2 - 4 \cdot 25 \cdot 4$$

$$\Delta = 400 - 400 = 0$$

$$x = \frac{-(-20) \pm \sqrt{0}}{2 \cdot 25}$$

$$x = \frac{20 \pm 0}{50} = \frac{20}{50} = \frac{2}{5}$$

$$S = \left\{ x \in \mathbb{R} \mid x = \frac{2}{5} \right\}$$

R020)

$$x^2 + 2x - 15 = 0$$

$$a=1 \quad b=2 \quad c=-15$$

$$\Delta = 2^2 - 4 \cdot 1 \cdot (-15)$$

$$\Delta = 4 + 60 = 64$$

$$x = \frac{-2 \pm \sqrt{64}}{2 \cdot 1}$$

$$x = \frac{-2 \pm 8}{2}$$

$$x_1 = \frac{-2+8}{2} = \frac{6}{2} = 3$$

$$x_2 = \frac{-2-8}{2} = \frac{-10}{2} = -5$$

$$S = \{ x \in \mathbb{R} \mid x = 3 \text{ ou } x = -5 \}$$

R021)

$$\begin{array}{l}
 x^2 + 3x - 6 + 8 = 0 \\
 x^2 + 3x + 2 = 0 \\
 a = 1 \quad b = 3 \quad c = 2 \\
 \Delta = 3^2 - 4 \cdot 1 \cdot 2 \\
 \Delta = 9 - 8 = 1 \\
 x = \frac{-3 \pm \sqrt{1}}{2 \cdot 1}
 \end{array}
 \left\{
 \begin{array}{l}
 x = \frac{-3 \pm 1}{2} \\
 x_1 = \frac{-3 + 1}{2} = \frac{-2}{2} = -1 \\
 x_2 = \frac{-3 - 1}{2} = \frac{-4}{2} = -2 \\
 S = \{x \in \mathbb{R} \mid x = -1 \text{ ou } x = -2\}
 \end{array}
 \right.$$

R022)

$$\begin{array}{l}
 x^2 + x - 7 - 5 = 0 \\
 x^2 + x - 12 = 0 \\
 a = 1 \quad b = 1 \quad c = -12 \\
 \Delta = 1^2 - 4 \cdot 1 \cdot (-12) \\
 \Delta = 1 + 48 = 49 \\
 x = \frac{-1 \pm \sqrt{49}}{2 \cdot 1}
 \end{array}
 \left\{
 \begin{array}{l}
 x = \frac{-1 \pm 7}{2} \\
 x_1 = \frac{-1 + 7}{2} = \frac{6}{2} = 3 \\
 x_2 = \frac{-1 - 7}{2} = \frac{-8}{2} = -4 \\
 S = \{x \in \mathbb{R} \mid x = 3 \text{ ou } x = -4\}
 \end{array}
 \right.$$

R023)

$$\begin{array}{l}
 4x^2 - x + 1 - x - 3x^2 = 0 \\
 4x^2 - 3x^2 - x - x + 1 = 0 \\
 x^2 - 2x + 1 = 0 \\
 a = 1 \quad b = -2 \quad c = 1 \\
 \Delta = (-2)^2 - 4 \cdot 1 \cdot 1 \\
 \Delta = 4 - 4 = 0 \\
 x = \frac{-(-2) \pm \sqrt{0}}{2 \cdot 1}
 \end{array}
 \left\{
 \begin{array}{l}
 x = \frac{2 \pm 0}{2} \\
 x_1 = x_2 = \frac{2}{2} = 1 \\
 S = \{x \in \mathbb{R} \mid x = 1\}
 \end{array}
 \right.$$

R024)

$$\begin{aligned}
 &3x^2 + 5x + x + 9 - 2x^2 = 0 \\
 &3x^2 - 2x^2 + 5x + x + 9 = 0 \\
 &x^2 + 6x + 9 = 0 \\
 &a = 1 \quad b = 6 \quad c = 9 \\
 &\Delta = 6^2 - 4 \cdot 1 \cdot 9 \\
 &\Delta = 36 - 36 = 0 \\
 &x = \frac{-6 \pm \sqrt{0}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{-6 \pm 0}{2} \\
 &x_1 = x_2 = \frac{-6}{2} = -3 \\
 &S = \{x \in \mathbb{R} \mid x = -3\}
 \end{aligned}
 \right.$$

R025)

$$\begin{aligned}
 &4 + x^2 - 4x = x \\
 &x^2 - 4x - x + 4 = 0 \\
 &x^2 - 5x + 4 = 0 \\
 &a = 1 \quad b = -5 \quad c = 4 \\
 &\Delta = (-5)^2 - 4 \cdot 1 \cdot 4 \\
 &\Delta = 25 - 16 = 9 \\
 &x = \frac{-(-5) \pm \sqrt{9}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{+5 \pm 3}{2} \\
 &x_1 = \frac{5+3}{2} = \frac{8}{2} = 4 \\
 &x_2 = \frac{5-3}{2} = \frac{2}{2} = 1 \\
 &S = \{x \in \mathbb{R} \mid x = 4 \text{ ou } x = 1\}
 \end{aligned}
 \right.$$

R026)

$$\begin{aligned}
 &x^2 + 3x - 40 = 0 \\
 &a=1 \quad b=3 \quad c=-40 \\
 &\Delta = 3^2 - 4 \cdot 1 \cdot (-40) \\
 &\Delta = 9 + 160 = 169 \\
 &x = \frac{-3 \pm \sqrt{169}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{-3 \pm 13}{2} \\
 &x_1 = \frac{-3+13}{2} = \frac{10}{2} = 5 \\
 &x_2 = \frac{-3-13}{2} = \frac{-16}{2} = -8 \\
 &S = \{x \in \mathbb{R} \mid x=5 \text{ ou } x=-8\}
 \end{aligned}
 \right.$$

R027)

$$\begin{aligned}
 &a=1 \quad b=5 \quad c=6 \\
 &\Delta = 5^2 - 4 \cdot 1 \cdot 6 \\
 &\Delta = 25 - 24 = 1 \\
 &x = \frac{-5 \pm \sqrt{1}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{-5 \pm 1}{2} \\
 &x_1 = \frac{-5+1}{2} = \frac{-4}{2} = -2 \\
 &x_2 = \frac{-5-1}{2} = \frac{-6}{2} = -3 \\
 &S = \{x \in \mathbb{R} \mid x=-2 \text{ ou } x=-3\}
 \end{aligned}
 \right.$$

R028)

$$\begin{aligned}
 &a=1 \quad b=-7 \quad c=12 \\
 &\Delta = (-7)^2 - 4 \cdot 1 \cdot 12 \\
 &\Delta = 49 - 48 = 1 \\
 &x = \frac{-(-7) \pm \sqrt{1}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{7 \pm 1}{2} \\
 &x_1 = \frac{7+1}{2} = \frac{8}{2} = 4 \\
 &x_2 = \frac{7-1}{2} = \frac{6}{2} = 3 \\
 &S = \{x \in \mathbb{R} \mid x=4 \text{ ou } x=3\}
 \end{aligned}
 \right.$$

R029)

$$\begin{aligned}
 a &= 1 \quad b = 5 \quad c = 4 \\
 \Delta &= 5^2 - 4 \cdot 1 \cdot 4 \\
 \Delta &= 25 - 16 \\
 \Delta &= 9 \\
 x &= \frac{-5 \pm \sqrt{9}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{-5 \pm 3}{2} \\
 x_1 &= \frac{-5+3}{2} = \frac{-2}{2} = -1 \\
 x_2 &= \frac{-5-3}{2} = \frac{-8}{2} = -4 \\
 S &= \{x \in \mathbb{R} \mid x = -1 \text{ ou } x = -4\}
 \end{aligned}
 \right.$$

R030)

$$\begin{aligned}
 a &= 7 \quad b = 1 \quad c = 2 \\
 \Delta &= 1^2 - 4 \cdot 7 \cdot 2 \\
 \Delta &= 1 - 56 = -55 \\
 \Delta &< 0
 \end{aligned}
 \quad S = \emptyset$$

R031)

$$\begin{aligned}
 a &= 1 \quad b = -18 \quad c = 45 \\
 \Delta &= (-18)^2 - 4 \cdot 1 \cdot 45 \\
 \Delta &= 324 - 180 \\
 \Delta &= 144 \\
 x &= \frac{-(-18) \pm \sqrt{144}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{18 \pm 12}{2} \\
 x_1 &= \frac{18+12}{2} = \frac{30}{2} = 15 \\
 x_2 &= \frac{18-12}{2} = \frac{6}{2} = 3 \\
 S &= \{x \in \mathbb{R} \mid x = 15 \text{ ou } x = 3\}
 \end{aligned}
 \right.$$

R032)

$$\begin{aligned}
 a &= -1 \quad b = -1 \quad c = 30 \\
 \Delta &= (-1)^2 - 4 \cdot (-1) \cdot 30 \\
 \Delta &= 1 + 120 \\
 \Delta &= 121 \\
 x &= \frac{-(-1) \pm \sqrt{121}}{2 \cdot (-1)}
 \end{aligned}
 \left|
 \begin{aligned}
 x &= \frac{-1 \pm 11}{2} \\
 x_1 &= \frac{-1 + 11}{2} = \frac{10}{2} = 5 \\
 x_2 &= \frac{-1 - 11}{2} = \frac{-12}{2} = -6 \\
 S &= \{x \in \mathbb{R} \mid x = 5 \text{ ou } x = -6\}
 \end{aligned}
 \right.$$

R033)

$$\begin{aligned}
 a &= 1 \quad b = -6 \quad c = 9 \\
 \Delta &= (-6)^2 - 4 \cdot 1 \cdot 9 \\
 \Delta &= 36 - 36 \\
 \Delta &= 0 \\
 x &= \frac{-(-6) \pm \sqrt{0}}{2 \cdot 1}
 \end{aligned}
 \left|
 \begin{aligned}
 x &= \frac{6 \pm 0}{2} \\
 x_1 = x_2 &= \frac{6}{2} = 3 \\
 S &= \{x \in \mathbb{R} \mid x = 3\}
 \end{aligned}
 \right.$$

R034)

$$\begin{aligned}
 x^2 + 2 \cdot x \cdot 3 + 3^2 &= 1 \\
 x^2 + 6x + 9 &= 1 \\
 x^2 + 6x + 9 - 1 &= 0 \\
 x^2 + 6x + 8 &= 0 \\
 a &= 1 \quad b = 6 \quad c = 8 \\
 \Delta &= 6^2 - 4 \cdot 1 \cdot 8 \\
 \Delta &= 36 - 32 \\
 \Delta &= 4
 \end{aligned}
 \left|
 \begin{aligned}
 x &= \frac{-6 \pm \sqrt{4}}{2 \cdot 1} = \frac{-6 \pm 2}{2} \\
 x_1 &= \frac{-6 + 2}{2} = \frac{-4}{2} = -2 \\
 x_2 &= \frac{-6 - 2}{2} = \frac{-8}{2} = -4 \\
 S &= \{x \in \mathbb{R} \mid x = -2 \text{ ou } x = -4\}
 \end{aligned}
 \right.$$

R035)

$$\begin{aligned}
 &x^2 - 2 \cdot x \cdot 5 + 5^2 = 1 \\
 &x^2 - 10x + 25 - 1 = 0 \\
 &x^2 - 10x + 24 = 0 \\
 &a=1 \quad b=-10 \quad c=24 \\
 &\Delta = (-10)^2 - 4 \cdot 1 \cdot 24 \\
 &\Delta = 100 - 96 = 4 \\
 &x = \frac{-(-10) \pm \sqrt{4}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{10 \pm 2}{2} \\
 &x_1 = \frac{10+2}{2} = \frac{12}{2} = 6 \\
 &x_2 = \frac{10-2}{2} = \frac{8}{2} = 4 \\
 &S = \{x \in \mathbb{R} \mid x=6 \text{ ou } x=4\}
 \end{aligned}
 \right.$$

R036)

$$\begin{aligned}
 &(2x)^2 - 2 \cdot 2x \cdot 4 + 4^2 = 0 \\
 &4x^2 - 16x + 16 = 0 \\
 &\text{DIVIDINDO TUDO POR 4} \\
 &x^2 - 4x + 4 = 0 \\
 &a=1 \quad b=-4 \quad c=4 \\
 &\Delta = (-4)^2 - 4 \cdot 1 \cdot 4 \\
 &\Delta = 16 - 16 = 0
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{-(-4) \pm \sqrt{0}}{2 \cdot 1} = \frac{4 \pm 0}{2} \\
 &x_1 = x_2 = \frac{4}{2} = 2 \\
 &S = \{x \in \mathbb{R} \mid x=2\}
 \end{aligned}
 \right.$$

R037)

$$\begin{aligned}
 x^2 - 2 \cdot x \cdot 3 + 3^2 &= -2x^2 \\
 x^2 - 6x + 9 + 2x^2 &= 0 \\
 x^2 + 2x^2 - 6x + 9 &= 0 \\
 3x^2 - 6x + 9 &= 0 \\
 \text{DIV. TUDO POR 3} \\
 x^2 - 2x + 3 &= 0 \\
 a=1 \quad b=-2 \quad c=3 \\
 \Delta &= (-2)^2 - 4 \cdot 1 \cdot 3 = \\
 \Delta &= 4 - 12 = -8
 \end{aligned}
 \left. \vphantom{\begin{aligned} x^2 - 2 \cdot x \cdot 3 + 3^2 &= -2x^2 \\ x^2 - 6x + 9 + 2x^2 &= 0 \\ x^2 + 2x^2 - 6x + 9 &= 0 \\ 3x^2 - 6x + 9 &= 0 \\ \text{DIV. TUDO POR 3} \\ x^2 - 2x + 3 &= 0 \\ a=1 \quad b=-2 \quad c=3 \\ \Delta &= (-2)^2 - 4 \cdot 1 \cdot 3 = \\ \Delta &= 4 - 12 = -8 \end{aligned}} \right\} \begin{aligned} \Delta &< 0 \\ S &= \emptyset \end{aligned}$$

R038)

$$\begin{aligned}
 x + x^2 &= 90 \\
 x^2 + x - 90 &= 0 \\
 a=1 \quad b=1 \quad c=-90 \\
 \Delta &= 1^2 - 4 \cdot 1 \cdot (-90) \\
 \Delta &= 1 + 360 \\
 \Delta &= 361 \\
 x &= \frac{-1 \pm \sqrt{361}}{2 \cdot 1}
 \end{aligned}
 \left. \vphantom{\begin{aligned} x + x^2 &= 90 \\ x^2 + x - 90 &= 0 \\ a=1 \quad b=1 \quad c=-90 \\ \Delta &= 1^2 - 4 \cdot 1 \cdot (-90) \\ \Delta &= 1 + 360 \\ \Delta &= 361 \\ x &= \frac{-1 \pm \sqrt{361}}{2 \cdot 1} \end{aligned}} \right\} \begin{aligned} x &= \frac{-1 \pm 19}{2} \\ x_1 &= \frac{-1+19}{2} = \frac{18}{2} = 9 \\ x_2 &= \frac{-1-19}{2} = \frac{-20}{2} = -10 \\ S &= \{x \in \mathbb{R} \mid x=9 \text{ ou } x=-10\} \end{aligned}$$

R039)

$$\begin{array}{l}
 x^2 + x = 12 \\
 x^2 + x - 12 = 0 \\
 a=1 \quad b=1 \quad c=-12 \\
 \Delta = 1^2 - 4 \cdot 1 \cdot (-12) \\
 \Delta = 1 + 48 = 49 \\
 x = \frac{-1 \pm \sqrt{49}}{2 \cdot 1}
 \end{array}
 \left\{
 \begin{array}{l}
 x = \frac{-1 \pm 7}{2} \\
 x_1 = \frac{-1+7}{2} = \frac{6}{2} = 3 \\
 x_2 = \frac{-1-7}{2} = \frac{-8}{2} = -4 \\
 S = \{ x \in \mathbb{R} \mid x=3 \text{ ou } x=-4 \}
 \end{array}
 \right.$$

R040)

$$\begin{array}{l}
 x^2 - 2x = -1 \\
 x^2 - 2x + 1 = 0 \\
 a=1 \quad b=-2 \quad c=1 \\
 \Delta = (-2)^2 - 4 \cdot 1 \cdot 1 \\
 \Delta = 4 - 4 = 0 \\
 x = \frac{-(-2) \pm \sqrt{0}}{2 \cdot 1}
 \end{array}
 \left\{
 \begin{array}{l}
 x = \frac{2 \pm 0}{2} \\
 x_1 = x_2 = \frac{2}{2} = 1 \\
 S = \{ x \in \mathbb{R} \mid x=1 \}
 \end{array}
 \right.$$

R041)

$$\begin{aligned}
 x^2 - 2x &= 80 \\
 x^2 - 2x - 80 &= 0 \\
 a=1 \quad b=-2 \quad c=-80 \\
 \Delta &= (-2)^2 - 4 \cdot 1 \cdot (-80) \\
 \Delta &= 4 + 320 \\
 \Delta &= 324 \\
 x &= \frac{-(-2) \pm \sqrt{324}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{2 \pm 18}{2} \\
 x_1 &= \frac{2+18}{2} = \frac{20}{2} = 10 \\
 x_2 &= \frac{2-18}{2} = \frac{-16}{2} = -8 \\
 S &= \{x \in \mathbb{R} \mid x=10 \text{ ou } x=-8\}
 \end{aligned}
 \right.$$

R042)

$$\begin{aligned}
 x^2 + 25 &= 10x \\
 x^2 - 10x + 25 &= 0 \\
 a=1 \quad b=-10 \quad c=25 \\
 \Delta &= (-10)^2 - 4 \cdot 1 \cdot 25 \\
 \Delta &= 100 - 100 \\
 \Delta &= 0 \\
 x &= \frac{-(-10) \pm \sqrt{0}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{10 \pm 0}{2} \\
 x_1 = x_2 &= \frac{10}{2} = 5 \\
 S &= \{x \in \mathbb{R} \mid x=5\}
 \end{aligned}
 \right.$$

R043)

$$\begin{aligned}
 x^2 + 3x &= 7x \\
 x^2 + 3x - 7x &= 0 \\
 x^2 - 4x &= 0 \\
 x(x-4) &= 0
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= 0 \\
 x-4 &= 0 \\
 x &= 4
 \end{aligned}
 \right.
 \quad S = \{x \in \mathbb{R} \mid x=0 \text{ ou } x=4\}$$

R044)

$$\begin{aligned}
 x^2 - 4x &= 5 \\
 x^2 - 4x - 5 &= 0 \\
 a=1 \quad b=-4 \quad c=-5 \\
 \Delta &= (-4)^2 - 4 \cdot 1 \cdot (-5) \\
 \Delta &= 16 + 20 = 36 \\
 x &= \frac{-(-4) \pm \sqrt{36}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{4 \pm 6}{2} \\
 x_1 &= \frac{4+6}{2} = \frac{10}{2} = 5 \\
 x_2 &= \frac{4-6}{2} = \frac{-2}{2} = -1 \\
 S &= \{x \in \mathbb{R} \mid x=5 \text{ ou } x=-1\}
 \end{aligned}
 \right.$$

R045)

$$\begin{aligned}
 x^2 &= x \cdot 3 + 18 \\
 x^2 - 3x - 18 &= 0 \\
 a=1 \quad b=-3 \quad c=-18 \\
 \Delta &= (-3)^2 - 4 \cdot 1 \cdot (-18) \\
 \Delta &= 9 + 72 = 81 \\
 x &= \frac{-(-3) \pm \sqrt{81}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{3 \pm 9}{2} \\
 x_1 &= \frac{3+9}{2} = \frac{12}{2} = 6 \\
 x_2 &= \frac{3-9}{2} = \frac{-6}{2} = -3 \\
 S &= \{x \in \mathbb{R} \mid x=6 \text{ ou } x=-3\}
 \end{aligned}
 \right.$$

R046)

$$\begin{aligned}
 2x^2 &= x \cdot 7 - 3 \\
 2x^2 - 7x + 3 &= 0 \\
 a &= 2 \quad b = -7 \quad c = 3 \\
 \Delta &= (-7)^2 - 4 \cdot 2 \cdot 3 \\
 \Delta &= 49 - 24 = 25 \\
 x &= \frac{-(-7) \pm \sqrt{25}}{2 \cdot 2}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{7 \pm 5}{4} \\
 x_1 &= \frac{7+5}{4} = \frac{12}{4} = 3 \\
 x_2 &= \frac{7-5}{4} = \frac{2}{4} = \frac{1}{2} \\
 S &= \left\{ x \in \mathbb{R} \mid x = 3 \text{ ou } x = \frac{1}{2} \right\}
 \end{aligned}
 \right.$$

R047)

$$\begin{aligned}
 x^2 - 3(x+1) &= 15 \\
 x^2 - 3x - 3 - 15 &= 0 \\
 x^2 - 3x - 18 &= 0 \\
 a &= 1 \quad b = -3 \quad c = -18 \\
 \Delta &= (-3)^2 - 4 \cdot 1 \cdot (-18) \\
 \Delta &= 9 + 72 = 81 \\
 x &= \frac{-(-3) \pm \sqrt{81}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{3 \pm 9}{2} \\
 x_1 &= \frac{3+9}{2} = \frac{12}{2} = 6 \\
 x_2 &= \frac{3-9}{2} = \frac{-6}{2} = -3 \\
 S &= \left\{ x \in \mathbb{R} \mid x = 6 \text{ ou } x = -3 \right\}
 \end{aligned}
 \right.$$

R048)

$$\begin{aligned}
 x + x^2 &= 56 \\
 x^2 + x - 56 &= 0 \\
 a &= 1 \quad b = 1 \quad c = -56 \\
 \Delta &= 1^2 - 4 \cdot 1 \cdot (-56) \\
 \Delta &= 1 + 224 = 225 \\
 x &= \frac{-1 \pm \sqrt{225}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{-1 \pm 15}{2} \\
 x_1 &= \frac{-1 + 15}{2} = \frac{14}{2} = 7 \\
 x_2 &= \frac{-1 - 15}{2} = \frac{-16}{2} = -8 \\
 S &= \{x \in \mathbb{R} \mid x = 7 \text{ ou } x = -8\}
 \end{aligned}
 \right.$$

R049)

$$\begin{aligned}
 x^2 + 2x &= 35 \\
 x^2 + 2x - 35 &= 0 \\
 a &= 1 \quad b = 2 \quad c = -35 \\
 \Delta &= 2^2 - 4 \cdot 1 \cdot (-35) \\
 \Delta &= 4 + 140 = 144 \\
 x &= \frac{-2 \pm \sqrt{144}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 x &= \frac{-2 \pm 12}{2} \\
 x_1 &= \frac{-2 + 12}{2} = \frac{10}{2} = 5 \\
 x_2 &= \frac{-2 - 12}{2} = \frac{-14}{2} = -7 \\
 S &= \{x \in \mathbb{R} \mid x = 5 \text{ ou } x = -7\}
 \end{aligned}
 \right.$$

R050)

$$\begin{aligned}
 &x^2 - 3x = 40 \\
 &x^2 - 3x - 40 = 0 \\
 &a = 1 \quad b = -3 \quad c = -40 \\
 &\Delta = (-3)^2 - 4 \cdot 1 \cdot (-40) \\
 &\Delta = 9 + 160 = 169 \\
 &x = \frac{-(-3) \pm \sqrt{169}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{3 \pm 13}{2} \\
 &x_1 = \frac{3 + 13}{2} = \frac{16}{2} = 8 \\
 &x_2 = \frac{3 - 13}{2} = \frac{-10}{2} = -5 \\
 &S = \{x \in \mathbb{R} \mid x = 8 \text{ ou } x = -5\}
 \end{aligned}
 \right.$$

R051)

$$\begin{aligned}
 &3x^2 - 2x = 40 \\
 &3x^2 - 2x - 40 = 0 \\
 &a = 3 \quad b = -2 \quad c = -40 \\
 &\Delta = (-2)^2 - 4 \cdot 3 \cdot (-40) \\
 &\Delta = 4 + 480 = 484 \\
 &x = \frac{-(-2) \pm \sqrt{484}}{2 \cdot 3}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{2 \pm 22}{6} \\
 &x_1 = \frac{2 + 22}{6} = \frac{24}{6} = 4 \\
 &x_2 = \frac{2 - 22}{6} = \frac{-20}{6} = -\frac{10}{3} \\
 &S = \{x \in \mathbb{R} \mid x = 4 \text{ ou } -\frac{10}{3}\}
 \end{aligned}
 \right.$$

R052)

$$\begin{aligned}
 &x^2 + 2x = 48 \\
 &x^2 + 2x - 48 = 0 \\
 &a=1 \quad b=2 \quad c=-48 \\
 &\Delta = 2^2 - 4 \cdot 1 \cdot (-48) \\
 &\Delta = 4 + 192 = 196 \\
 &x = \frac{-2 \pm \sqrt{196}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{-2 \pm 14}{2} \\
 &x_1 = \frac{-2+14}{2} = \frac{12}{2} = 6 \\
 &x_2 = \frac{-2-14}{2} = \frac{-16}{2} = -8 \\
 &S = \{x \in \mathbb{R} \mid x = 6 \text{ ou } x = -8\}
 \end{aligned}
 \right.$$

R053)

$$\begin{aligned}
 &3x - x^2 = 2 \\
 &-x^2 + 3x - 2 = 0 \\
 &a=-1 \quad b=3 \quad c=-2 \\
 &\Delta = 3^2 - 4 \cdot (-1) \cdot (-2) \\
 &\Delta = 9 - 8 = 1 \\
 &x = \frac{-3 \pm \sqrt{1}}{2 \cdot (-1)}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{+3 \pm 1}{2} \\
 &x_1 = \frac{3+1}{2} = \frac{4}{2} = 2 \\
 &x_2 = \frac{3-1}{2} = \frac{2}{2} = 1 \\
 &S = \{x \in \mathbb{R} \mid x = 1 \text{ ou } x = 2\}
 \end{aligned}
 \right.$$

R054)

$$\begin{aligned}
 &x^2 - 2 \cdot x \cdot 3 + 3^2 = 0 \\
 &x^2 - 6x + 9 = 0 \\
 &a=1 \quad b=-6 \quad c=9 \\
 &\Delta = (-6)^2 - 4 \cdot 1 \cdot 9 \\
 &\Delta = 36 - 36 = 0 \\
 &x = \frac{-(-6) \pm \sqrt{0}}{2 \cdot 1}
 \end{aligned}
 \left\{
 \begin{aligned}
 &x = \frac{6 \pm 0}{2} \\
 &x_1 = x_2 = \frac{6}{2} = 3 \\
 &S = \{x \in \mathbb{R} \mid x = 3\}
 \end{aligned}
 \right.$$

R055

$$\begin{array}{l|l}
 \text{a) } S = -\frac{b}{a} = 11 & -K = 22 - 4 \\
 a = 2 \quad b = K - 4 & -K = 18 \times (-1) \\
 & K = -18 // \\
 -\frac{(K-4)}{2} = 11 & \\
 -(K-4) = 22 & \\
 -K + 4 = 22 &
 \end{array}$$

$$\begin{array}{l|l}
 \text{b) } a = 2 \quad c = 6K - 2 & 6K = 22 + 2 \\
 P = \frac{c}{a} = 11 & 6K = 24 \\
 \frac{6K-2}{2} = 11 & K = \frac{24}{6} \\
 6K - 2 = 22 & K = 4 //
 \end{array}$$

c) Para $x = 0$

$$2 \cdot 0^2 + (K-4) \cdot 0 + (6K-2) = 0$$

$$0 + 0 + 6K - 2 = 0$$

$$6K = 2$$

$$K = \frac{2}{6}$$

$$K = \frac{1}{3} //$$

d) Para $x=1$

$$2 \cdot 1^2 + (K-4) \cdot 1 + (6K-2) = 0$$

$$2 + K - 4 + 6K - 2 = 0$$

$$K + 6K + 2 - 4 - 2 = 0$$

$$7K - 4 = 0$$

$$7K = 4$$

$$K = \frac{4}{7} //$$

R056)

$$a=4 \quad b=(m-2)$$

$$S = -\frac{b}{a} = \frac{7}{2}$$

$$-\frac{(m-2)}{4} = \frac{7}{2}$$

$$-2(m-2) = 4 \cdot 7$$

$$-2m + 4 = 28$$

$$-2m = 28 - 4$$

$$-2m = 24 \quad \times (-1)$$

$$2m = -24$$

$$m = -\frac{24}{2}$$

$$m = -12 //$$

R057)

$$a=2 \quad b=2m-2$$

$$S = -\frac{b}{a} = -3$$

$$-\frac{2m-2}{2} = -3$$

$$\frac{2m-2}{2} = 3$$

$$2m-2 = 2 \cdot 3$$

$$2m - 2 = 6$$

$$2m = 6 + 2$$

$$2m = 8$$

$$m = \frac{8}{2}$$

$$m = 4 //$$

R058)

$$\begin{array}{lcl}
 a=1 & b=-(2p-4) & \\
 S=-\frac{b}{a} & & 2p=16 \\
 -\frac{-(2p-4)}{1}=12 & & p=\frac{16}{2} \\
 & & p=8//
 \end{array}$$

R059)

$$a=1 \quad c=m$$

$$p=\frac{c}{a}=5$$

$$\frac{m}{1}=5$$

$$m=5//$$

R060)

$$x^2-5x+m=0$$

$$\text{Para } x=3$$

$$3^2-5 \cdot 3+m=0$$

$$9-15+m=0$$

$$m=-9+15$$

$$m=6//$$

R061)

$$(x+4)^2 + (x+7)^2 = 15^2$$

$$x^2 + 8x + 16 + x^2 + 14x + 49 = 225$$

$$x^2 + x^2 + 8x + 14x + 16 + 49 - 225 = 0$$

$$2x^2 + 22x - 160 = 0$$

$$x^2 + 11x - 80 = 0$$

$$a=1 \quad b=11 \quad c=-80$$

$$\Delta = 11^2 - 4 \cdot 1 \cdot (-80)$$

$$\Delta = 121 + 320 = 441$$

$$x = \frac{-11 \pm \sqrt{441}}{2 \cdot 1} = \frac{-11 \pm 21}{2}$$

$$x_1 = \frac{-11 + 21}{2} = \frac{10}{2} = 5$$

$$x_2 = \frac{-11 - 21}{2} = -\frac{32}{2} = -16$$

$$x+4 = 5+4 = 9$$

$$x+7 = 5+7 = 12$$

$$2P = 9 + 12 + 15 = 36 //$$

R062)

$$A = \frac{(B+b) \cdot h}{2} \cdot R = 216$$

$$B = x+4$$

$$b = x$$

$$h = x-4$$

$$\frac{(x+4+x) \cdot (x-4)}{2} = 216$$

$$(2x+4) \cdot (x-4) = 216$$

$$2x^2 - 8x + 4x - 16 = 2 \cdot 216$$

$$2x^2 - 8x + 4x - 16 = 432$$

$$2x^2 - 4x - 16 - 432 = 0$$

$$2x^2 - 4x - 448 = 0$$

$$a=2 \quad b=-4 \quad c=-448$$

$$\Delta = (-4)^2 - 4 \cdot 2 \cdot (-448)$$

$$\Delta = 16 + 3584 = 3600$$

$$x = \frac{-(-4) \pm \sqrt{3600}}{2 \cdot 2} = \frac{4 \pm 60}{4}$$

$$x_1 = \frac{4+60}{4} = \frac{64}{4} = 16 //$$

$$x_2 = \frac{4-60}{4} = -\frac{56}{4} = -14$$

R063)

$$\begin{aligned}
 A_{\text{terreno}} &= 80 \cdot 50 = 4000 \\
 A_{\text{barreira}} &= (80-2x) \cdot (50-2x) = 1000 \\
 A_B &= 80 \cdot 50 - 80 \cdot 2x - 2x \cdot 50 + 2x \cdot 2x = 1000 \\
 4000 - 160x - 100x + 4x^2 &= 1000 \\
 4x^2 - 260x + 4000 - 1000 &= 0 \\
 4x^2 - 260x + 3000 &= 0 \\
 x^2 - 65x + 750 &= 0
 \end{aligned}$$

$$\left. \begin{aligned}
 a &= 1 \quad b = -65 \quad c = 750 \\
 \Delta &= (-65)^2 - 4 \cdot 1 \cdot 750 \\
 \Delta &= 4225 - 3000 = 1225 \\
 x &= \frac{-(-65) \pm \sqrt{1225}}{2 \cdot 1} \\
 x_1 &= \frac{65 + 35}{2} = \frac{100}{2} = 50 \\
 x_2 &= \frac{65 - 35}{2} = \frac{30}{2} = 15
 \end{aligned} \right\}$$

R064)

$$\begin{aligned}
 x(x-1) &= 380 \\
 x^2 - x - 380 &= 0 \\
 a &= 1 \quad b = -1 \quad c = -380 \\
 \Delta &= (-1)^2 - 4 \cdot 1 \cdot (-380) \\
 \Delta &= 1 + 1520 = 1521 \\
 x &= \frac{-(-1) \pm \sqrt{1521}}{2 \cdot 1}
 \end{aligned}$$

$$\left. \begin{aligned}
 x &= \frac{1 \pm 39}{2} \\
 x_1 &= \frac{1+39}{2} = \frac{40}{2} = 20 \\
 x_2 &= \frac{1-39}{2} = \frac{-38}{2} = -19
 \end{aligned} \right\}$$

R065)

$$\begin{aligned}
 x^2 &= \frac{x \cdot (x+2)}{2} \\
 2x^2 &= x^2 + 2x \\
 2x^2 - x^2 - 2x &= 0 \\
 x^2 - 2x &= 0 \\
 x(x-2) &= 0 \quad \begin{cases} x=0 \\ x=2 \end{cases}
 \end{aligned}$$

$$\begin{aligned}
 a) \quad x &= 2 \\
 b) \quad x^2 &= 2^2 = 4 \\
 c) \quad \frac{x(x+2)}{2} &= \frac{2(2+2)}{2} = \frac{2 \cdot 4}{2} = 4
 \end{aligned}$$

R066)

$$(x+6) \cdot (x+2) = 140$$

$$x^2 + 2x + 6x + 12 = 140$$

$$x^2 + 8x + 12 - 140 = 0$$

$$x^2 + 8x - 128 = 0$$

$$a=1 \quad b=8 \quad c=-128$$

$$\Delta = 8^2 - 4 \cdot 1 \cdot (-128)$$

$$\Delta = 64 + 512 = 576$$

$$x = \frac{-8 \pm \sqrt{576}}{2 \cdot 1}$$

$$x = \frac{-8 \pm 24}{2}$$

$$x_1 = \frac{-8 + 24}{2} = \frac{16}{2} = 8$$

$$x_2 = \frac{-8 - 24}{2} = \frac{-32}{2} = -16$$

a)

$$2P = 2(x+6) + 2(x+2)$$

$$2P = 2(8+6) + 2(8+2) = 2 \cdot 14 + 2 \cdot 10 = 28 + 20 = 48 \text{ cm}$$

$$A = (x+6)^2 = (8+6)^2 = 14^2 = 196 \text{ cm}^2$$