

Exercice 1.32 Résoudre

$$\begin{aligned} \text{a) } x^2 &= 49 && \sqrt{} \\ x &= \pm \sqrt{49} \\ x &= \pm 7 \\ S &= \{ \pm 7 \} \end{aligned}$$

$$\begin{aligned} \text{b) } 7x^2 - 252 &= 0 \\ 7x^2 &= 252 \\ x^2 &= 36 \\ x &= \pm 6 \\ S &= \{ \pm 6 \} \end{aligned}$$

$$\begin{aligned} \text{c) } 7x^2 + 252 &= 0 \\ 7x^2 &= -252 \\ &\uparrow \\ &\text{impossible!} \\ &\text{car } 7x^2 > 0 \\ S &= \emptyset \end{aligned}$$

$$\begin{aligned} \text{d) } 4x^2 &= 0 \\ x^2 &= 0 \\ x &= 0 \\ S &= \{ 0 \} \end{aligned}$$

$$\begin{aligned} \text{e) } 2x^2 - 3x - 2 &= 0 \\ a=2 \quad b=-3 \quad c=-2 \\ \Delta &= (-3)^2 - 4 \cdot 2 \cdot (-2) = 9 + 16 = 25 \\ \Rightarrow x_{1,2} &= \frac{3 \pm 5}{4} = \begin{cases} \frac{8}{4} = 2 \\ -\frac{2}{4} = -\frac{1}{2} \end{cases} \\ \Rightarrow S &= \left\{ -\frac{1}{2}; 2 \right\} \end{aligned}$$

$$\begin{aligned} \text{f) } -x^2 - 3 + 2x &= 0 \\ -x^2 + 2x - 3 &= 0 \\ \Delta &= 2^2 - 4 \cdot (-1) \cdot (-3) = 4 - 12 = -8 < 0 \\ S &= \emptyset \end{aligned}$$

$$\begin{aligned} \text{g) } 10y^2 + 31y - 14 &= 0 \\ \Delta &= 31^2 - 4 \cdot 10 \cdot (-14) = 1521 = 39^2 \\ y_{1,2} &= \frac{-31 \pm 39}{20} = \begin{cases} \frac{8}{20} = \frac{2}{5} \\ -\frac{70}{20} = -\frac{7}{2} \end{cases} \\ S &= \left\{ -\frac{7}{2}; \frac{2}{5} \right\} \end{aligned}$$

$$\begin{aligned} \text{h) } 25x - 25 - 6x^2 &= 0 \\ -6x^2 + 25x - 25 &= 0 \\ \Delta &= 25^2 - 4 \cdot (-6) \cdot (-25) = 25 \\ x_{1,2} &= \frac{-25 \pm 5}{-12} = \begin{cases} \frac{-30}{-12} = \frac{5}{2} \\ \frac{20}{-12} = \frac{5}{3} \end{cases} \\ S &= \left\{ \frac{5}{3}; \frac{5}{2} \right\} \end{aligned}$$

$$\begin{aligned} \text{i) } z^2 - 14z - 49 &= 0 \\ \Delta &= 14^2 - 4 \cdot 1 \cdot (-49) = 196 + 196 = 392 \\ \sqrt{392} &= \sqrt{196 \cdot 2} = \sqrt{196} \sqrt{2} = 14\sqrt{2} \\ z_{1,2} &= \frac{14 \pm 14\sqrt{2}}{2} = 7 \pm 7\sqrt{2} \\ S &= \{ 7 \pm 7\sqrt{2} \} \end{aligned}$$

$$\begin{aligned} \text{j) } 6x^2 - x - 2 &= 0 \\ 6x^2 - x - 2 &= 0 \\ \Delta &= 1^2 - 4 \cdot 6 \cdot (-2) = 49 \\ x_{1,2} &= \frac{1 \pm 7}{12} = \begin{cases} \frac{8}{12} = \frac{2}{3} \\ -\frac{6}{12} = -\frac{1}{2} \end{cases} \\ S &= \left\{ -\frac{1}{2}; \frac{2}{3} \right\} \end{aligned}$$

Exercice 1.34 Résoudre

a) $(x - 3)(x + 5) = 0$

$x - 3 = 0 \quad x + 5 = 0$
 $x = 3 \quad x = -5$

$S = \{-5; 3\}$

b) $x(x - 7) = 0$

$0 \quad 7$

$S = \{0; 7\}$

c) $5(2x - 9) = 0$

$5 \neq 0 \quad \emptyset$
 $2x - 9 = 0$
 $2x = 9$
 $x = 9/2$

$S = \{9/2\}$

d) $(x + 5)^2 = 0$

-5 (double)

$S = \{-5\}$

e) $(x + 2)(x - 2)(x^2 + 9) = 0$

$-2 \quad 2 \quad \emptyset$

$S = \{\pm 2\}$

f) $(2x - 3)(2x + 3) = 0$

$2x - 3 = 0 \quad 2x + 3 = 0$
 $2x = 3 \quad 2x = -3$
 $x = 3/2 \quad x = -3/2$

$S = \{\pm 3/2\}$

g) $(5x - 7)^3 = 0$

$5x = 7$
 $x = 7/5$ (triple)

$S = \{7/5\}$

h) $(x - 2)(x^2 + 2x + 4) = 0$

2
 $\Delta = 2^2 - 4 \cdot 1 \cdot 4 < 0$
 \emptyset

$S = \{2\}$

i) $3x^2(5x - 2)(x - 8)^2(3x - 2)^5 = 0$

$0 \quad 2/5 \quad 8 \quad 2/3$

$S = \{0; 2/5; 8; 2/3\}$

j) $8(2x - 0,01)(\frac{2}{3}x - 5)(\frac{3x}{2} - 1) = 0$

\emptyset
 $2x = 0,01 \quad 2x = 15 \quad 3x = 2$
 $x = 0,005 \quad x = 15/2 \quad x = 2/3$

$S = \{0,005; 15/2; 2/3\}$

k) $\frac{2x + 7}{3} \cdot \frac{(3x - 5)^2}{4} \cdot \frac{7}{5} = 0$

$2x + 7 = 0 \quad 3x - 5 = 0$
 $x = -7/2 \quad x = 5/3$
 \emptyset

$S = \{-7/2; 5/3\}$