

Resolução - Equações de 2º grau

1. $6x^2 + x - 2 = 0$

$$a = 6 \quad b = 1 \quad c = -2$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \times 6 \times (-2)}}{2 \times 6} \Leftrightarrow x = \frac{-1 \pm \sqrt{1+48}}{12} \Leftrightarrow x = \frac{-1 \pm \sqrt{49}}{12}$$

$$\Leftrightarrow x = \frac{-1+7}{12} \vee x = \frac{-1-7}{12} \Leftrightarrow x = \frac{6}{12} \vee x = -\frac{8}{12} \Leftrightarrow x = \frac{1}{2} \vee x = -\frac{2}{3}$$

C.S. = $\{-\frac{2}{3}, \frac{1}{2}\}$

2022, 1ª fase, caderno 2

2. $-4x^2 - 4x + 3 = 0$

$$a = -4 \quad b = -4 \quad c = 3$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times (-4) \times 3}}{2 \times (-4)} \Leftrightarrow x = \frac{4 \pm \sqrt{16+48}}{-8} \Leftrightarrow x = \frac{4 \pm \sqrt{64}}{-8} \Leftrightarrow$$

$$\Leftrightarrow x = \frac{4+8}{-8} \vee x = \frac{4-8}{-8} \Leftrightarrow x = \frac{12}{-8} \vee x = \frac{-4}{-8} \Leftrightarrow x = -\frac{3}{2} \vee x = \frac{1}{2}$$

C.S. = $\{-\frac{3}{2}, \frac{1}{2}\}$

2021, 1ª fase, caderno 2

3. $10x^2 + x - 2 = 0$

$$a = 10 \quad b = 1 \quad c = -2$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \times 10 \times (-2)}}{2 \times 10} \Leftrightarrow x = \frac{-1 \pm \sqrt{81}}{20} \Leftrightarrow x = \frac{-1 \pm \sqrt{81}}{20} \Leftrightarrow$$

$$x = \frac{-1+9}{20} \vee x = \frac{-1-9}{20} \Leftrightarrow x = \frac{8}{20} \vee x = -\frac{10}{20} \Leftrightarrow x = \frac{2}{5} \vee x = -\frac{1}{2}$$

C.S. = $\{-\frac{1}{2}, \frac{2}{5}\}$

2019, 1ª fase, caderno 2

4. $20x^2 - 9x + 1 = 0$

$$a = 20 \quad b = -9 \quad c = 1$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{9 \pm \sqrt{(-9)^2 - 4 \times 20 \times 1}}{2 \times 20} \Leftrightarrow x = \frac{9 \pm \sqrt{81 - 80}}{40} \Leftrightarrow x = \frac{9 \pm \sqrt{1}}{40} \Leftrightarrow x = \frac{9+1}{40} \vee$$

$$x = \frac{9-1}{40} \Leftrightarrow x = \frac{10}{40} \vee x = \frac{8}{40} \Leftrightarrow x = \frac{1}{4} \vee x = \frac{4}{20} \Leftrightarrow x = \frac{1}{4} \vee x = \frac{2}{10} \Leftrightarrow x = \frac{1}{4} \vee x = \frac{1}{5}$$

C.S. = $\{\frac{1}{5}, \frac{1}{4}\}$

2019, 2ª fase, caderno 2

5. $8x^2 + 2x - 1 = 0$

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

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-2 \pm \sqrt{2^2 - 4 \times 8 \times (-1)}}{2 \times 8} \Leftrightarrow x = \frac{-2 \pm \sqrt{4 + 32}}{16} \Leftrightarrow x = \frac{-2 \pm \sqrt{36}}{16} \Leftrightarrow$$

$$x = \frac{-2+6}{16} \vee x = \frac{-2-6}{16} \Leftrightarrow x = \frac{4}{16} \vee x = -\frac{8}{16} \Leftrightarrow x = \frac{1}{4} \vee x = -\frac{1}{2}$$

C.S. = $\{-\frac{1}{2}, \frac{1}{4}\}$

2019, Época especial, caderno 2

6. $15x^2 - 2x - 1 = 0$

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

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{2 \pm \sqrt{(-2)^2 - 4 \times 15 \times (-1)}}{2 \times 15} \Leftrightarrow x = \frac{2 \pm \sqrt{4 + 60}}{30} \Leftrightarrow x = \frac{2 \pm \sqrt{64}}{30} \Leftrightarrow$$

$$x = \frac{2+8}{30} \vee x = \frac{2-8}{30} \Leftrightarrow x = \frac{10}{30} \vee x = \frac{-6}{30} \Leftrightarrow x = \frac{1}{3} \vee x = -\frac{1}{5}$$

C.S. = $\{-\frac{1}{5}, \frac{1}{3}\}$

2018, 1ª fase, caderno 2

7. $24x^2 + 2x - 1 = 0$

$$a = 24 \quad b = 2 \quad c = -1$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-2 \pm \sqrt{4 - 4 \times 24 \times (-1)}}{2 \times 24} \Leftrightarrow x = \frac{-2 \pm \sqrt{100}}{48} \Leftrightarrow x = \frac{-2+10}{48} \vee x = \frac{-2-10}{48}$$

$$\Leftrightarrow x = \frac{8}{48} \vee x = -\frac{12}{48} \Leftrightarrow x = \frac{1}{6} \vee x = -\frac{1}{4}$$

C.S. = $\{-\frac{1}{4}, \frac{1}{6}\}$

2018, 2ª fase, caderno 2

8. $15x^2 + 2x - 1 = 0$

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

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-2 \pm \sqrt{2^2 - 4 \times 15 \times (-1)}}{2 \times 15} \Leftrightarrow x = \frac{-2 \pm \sqrt{64}}{30} \Leftrightarrow x = \frac{-2+8}{30} \vee x = \frac{-2-8}{30}$$

$$\Leftrightarrow x = \frac{6}{30} \vee x = \frac{-10}{30} \Leftrightarrow x = \frac{1}{5} \vee x = -\frac{1}{3}$$

C.S. = $\{-\frac{1}{3}, \frac{1}{5}\}$

2018, Época especial, caderno 2

9. $6x^2 - x - 1 = 0$

$$a = 6 \quad b = -1 \quad c = -1$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{1 \pm \sqrt{1 - 4 \times 6 \times (-1)}}{2 \times 6} \Leftrightarrow x = \frac{1 \pm \sqrt{25}}{12} \Leftrightarrow x = \frac{1+5}{12} \vee x = \frac{1-5}{12}$$

$$\Leftrightarrow x = \frac{1}{2} \vee x = -\frac{1}{3}$$

C.S. = $\{-\frac{1}{3}, \frac{1}{2}\}$

2017, 1ª fase, caderno 2

10. $10x^2 - 3x - 1 = 0$

$$a = 10 \quad b = -3 \quad c = -1$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{3 \pm \sqrt{3^2 - 4 \times 10 \times (-1)}}{2 \times 10} \Leftrightarrow x = \frac{3 \pm \sqrt{49}}{20} \Leftrightarrow x = \frac{3+7}{20} \vee x = \frac{3-7}{20}$$

$$\Leftrightarrow x = \frac{1}{2} \vee x = -\frac{1}{5}$$

$$\text{C.S.} = \left\{-\frac{1}{5}, \frac{1}{2}\right\}$$

2017, 2ª fase, caderno 2

$$11. 2x^2 + 5x - 3 = 0$$

$$a = 2 \quad b = 5 \quad c = -3$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-5 \pm \sqrt{5^2 - 4 \times 2 \times (-3)}}{2 \times 2} \Leftrightarrow x = \frac{-5 \pm \sqrt{49}}{4} \Leftrightarrow x = \frac{-5+7}{4} \vee x = \frac{-5-7}{4} \Leftrightarrow$$

$$x = \frac{1}{2} \vee x = -3$$

$$\text{C.S.} = \left\{-3, \frac{1}{2}\right\}$$

2017, Época especial, caderno 2

$$12. x^2 + 3(x-2) = x-3 \Leftrightarrow x^2 + 3x - 6 = x-3 \Leftrightarrow x^2 + 3x - x - 6 + 3 = 0 \Leftrightarrow x^2 + 2x - 3 = 0$$

$$a = 1 \quad b = 2 \quad c = -3$$

Usando a fórmula resolvente temos:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-2 \pm \sqrt{4 - 4 \times 1 \times (-3)}}{2 \times 1} \Leftrightarrow x = \frac{-2 \pm \sqrt{16}}{2} \Leftrightarrow x = \frac{-2+4}{2} \vee x = \frac{-2-4}{2} \Leftrightarrow$$

$$x = 1 \vee x = -3$$

$$\text{C.S.} = \{-3, 1\}$$

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$$13. x(x-1)+2 = 3-x^2 \Leftrightarrow x^2 - x + 2 = 3 - x^2 \Leftrightarrow x^2 - x + 2 - 3 + x^2 = 0 \Leftrightarrow 2x^2 - x - 1 = 0$$

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

Usando a fórmula resolvente temos:

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{1 \pm \sqrt{1 - 4 \times 2 \times (-1)}}{2 \times 2} \Leftrightarrow x = \frac{1 \pm \sqrt{9}}{4} \Leftrightarrow x = \frac{1+3}{4} \vee x = \frac{1-3}{4} \\ \Leftrightarrow x &= 1 \vee x = -\frac{1}{2} \end{aligned}$$

$$\text{C.S.} = \left\{-\frac{1}{2}, 1\right\}$$

2016, 2ª fase, caderno 2

$$14. \quad 2x^2 = \frac{x+2}{3} \Leftrightarrow 6x^2 = x+2 \Leftrightarrow 6x^2 - x - 2 = 0$$

$$a = 6 \quad b = -1 \quad c = -2$$

Usando a fórmula resolvente temos:

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{1 \pm \sqrt{1^2 - 4 \times 6 \times (-2)}}{2 \times 6} \Leftrightarrow x = \frac{1 \pm \sqrt{49}}{12} \Leftrightarrow x = \frac{1+7}{12} \vee x = \frac{1-7}{12} \\ \Leftrightarrow x &= \frac{8}{12} \vee x = \frac{-6}{12} \Leftrightarrow x = \frac{2}{3} \vee x = -\frac{1}{2} \end{aligned}$$

$$\text{C.S.} = \left\{-\frac{1}{2}, \frac{2}{3}\right\}$$

2016, Época especial, caderno 2

$$15. \quad \frac{x(x-4)}{4} = 9 - x \Leftrightarrow \frac{x^2-4x}{4} = 9 - x \Leftrightarrow x^2 - 4x = 36 - 4x \Leftrightarrow x^2 - 36 = 0 \Leftrightarrow (x+6)(x-6) = 0 \Leftrightarrow x+6=0 \vee x-6=0 \Leftrightarrow x=-6 \vee x=6$$

$$\text{C.S.} = \{-6, 6\}$$

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$$16. \quad \frac{x^2+3}{4} + \frac{x-7}{2} = 1 \Leftrightarrow \frac{x^2+3}{4} + \frac{2x-14}{4} = \frac{4}{4} \Leftrightarrow x^2 + 3 + 2x - 14 = 4 \Leftrightarrow x^2 + 2x - 15 = 0$$

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

Usando a fórmula resolvente temos:

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{-2 \pm \sqrt{2^2 - 4 \times 1 \times (-15)}}{2 \times 1} \Leftrightarrow x = \frac{-2 \pm \sqrt{64}}{2} \Leftrightarrow x = \frac{-2+8}{2} \vee x = \frac{-2-8}{2} \\ \Leftrightarrow x &= 3 \vee x = -5 \end{aligned}$$

$$\text{C.S.} = \{-5, 3\}$$

2015, 2ª fase, caderno 2

$$17. x(6x - 1) = 1 \Leftrightarrow 6x^2 - x = 1 \Leftrightarrow 6x^2 - x - 1 = 0$$

$$a = 6 \quad b = -1 \quad c = -1$$

Usando a fórmula resolvente temos:

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Leftrightarrow x = \frac{1 \pm \sqrt{1 - 4 \times 6 \times (-1)}}{2 \times 6} \Leftrightarrow x = \frac{1 \pm \sqrt{25}}{12} \Leftrightarrow x = \frac{1+5}{12} \vee x = \frac{1-5}{12} \\ \Leftrightarrow x &= \frac{6}{12} \vee x = \frac{-4}{12} \Leftrightarrow x = \frac{1}{2} \vee x = -\frac{1}{3} \end{aligned}$$

$$\text{C.S.} = \left\{-\frac{1}{3}, \frac{1}{2}\right\}$$

2015, Época especial, caderno 2