

Raccolta di equazioni riconducibili al primo grado Equations

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- 1.** $x^2 + 2x + 1 = x + x^2 - 1$ [-2]
- 2.** $2x^2 - 1 - x = 2 - 2x + x^2 - 1 + x^2$ [2]
- 3.** $x(x + 1) + x = 4 + x + x^2$ [4]
- 4.** $(x - 1)(x + 1) - 5 = x(x + 1) - 2$ [-4]
- 5.** $x + (x + 1) \cdot (x - 1) = 5 + x^2$ [6]
- 6.** $(x + 6)(x - 6) + 30 - 9x = 3(10 - x^2) + 4x^2$ [-4]
- 7.** $(x + 1)^2 = x^2 - 3$ [-2]
- 8.** $(3 - x) \cdot (3 + x) - 5 = x \cdot (2x + 1) - 3x \cdot (x - 1)$ [1]
- 9.** $(x - 2)^2 - (x - 4) \cdot (x + 4) - 3x \cdot (2x - 1) - 24 = 3x \cdot (-2x + 1) - 4 \cdot (x + 1)$ [indeterm.]
- 10.** $3x \cdot (x + 7) + (x - 1)^2 = 2x \cdot (2x - 3) - 14$ $\left[-\frac{3}{5}\right]$
- 11.** $(x - 1)^2 + 2 \cdot (x - 1) + 6x = 5(x + 1) + 1 - 5x + (x + 1)^2$ [2]
- 12.** $(x + 3) \cdot (x - 3) + (2x + 3)^2 = 5x^2 + 7 \cdot (x - 5)$ [-7]
- 13.** $3x(1 - x) - (x - 3)^2 = 12 - (2x + 2)^2$ [1]
- 14.** $(3x + 1)(2x - 3) = 6x(x - 1) - x$ [impossibile]
- 15.** $\frac{3 \cdot (x - 3)^2}{4} + \frac{1}{4} + (x + 2)^2 = \frac{3}{4}x^2 - 6 + (x + 1) \cdot (x - 1) + 4x$ [4]
- 16.** $\frac{(2 - 3x) \cdot (1 + 3x)}{9} + \frac{(3x - 2)^2}{9} + \frac{5}{6} = 2x - \frac{5x + 1}{4}$ [1]
- 17.** $\left(\frac{3}{5} + x\right)^2 = x \cdot \left(x - \frac{6}{25}\right) + \frac{9}{5}$ [1]
- 18.** $\left(\frac{1}{2}x - \frac{3}{4}\right) \cdot \left(\frac{1}{2}x + \frac{3}{4}\right) = \left(\frac{1}{2}x + \frac{1}{4}\right)^2 + \frac{1}{4}x$ $\left[-\frac{5}{4}\right]$
- 19.** $-2x \cdot (x - 1) + (2x + 3)^2 - 8x = 2x^2 - 3$ [-2]

$$20. \quad -(4x - 3)^2 - 2(3x - 1) - 8x = 24x - (4x + 1)^2 \quad [-1]$$

$$21. \quad 2 - 5x + (x + 2)(x + 3) = (x - 3)^2 + 2x \quad \left[\frac{1}{4}\right]$$

$$22. \quad 2 + x + (x + 1)(x - 1) = -\frac{x + 1}{3} - \frac{2}{9} + (x - 1)^2 \quad \left[-\frac{1}{6}\right]$$

$$23. \quad x^2 - \frac{(x - 1)^2}{3} - \frac{(x - 2)^2}{3} = 2 + \frac{(x - 2)(x + 2)}{3} \quad \left[\frac{7}{6}\right]$$

$$24. \quad x + \frac{4}{5}x - 36 = \sqrt{x^2 - \left(\frac{4}{5}x\right)^2} \quad [18]$$

Soluzioni

$$\begin{aligned}x^2 + 2x + 1 &= x + x^2 - 1 \\x^2 - x^2 + 2x - x &= -1 - 1 \\x &= -2\end{aligned}$$

$$\begin{aligned}(-2)^2 + 2 \cdot (-2) + 1 &= -2 + (-2)^2 - 1 \\4 - 4 + 1 &= -2 + 4 - 1 \\1 &= 2 - 1 \\&\text{Verificata}\end{aligned}$$

$$\begin{aligned}2x^2 - 1 - x &= 2 - 2x + x^2 - 1 + x^2 \\2x^2 - x^2 - x^2 - x + 2x &= 2 - 1 + 1 \\x &= 2\end{aligned}$$

$$\begin{aligned}2 \cdot 2^2 - 1 - 2 &= 2 - 2 \cdot 2 + 2^2 - 1 + 2^2 \\8 - 1 - 2 &= 2 - 4 + 4 - 1 + 4 \\7 - 2 &= 2 - 1 + 4 \\5 &= 5 \\&\text{Verificata}\end{aligned}$$

$$\begin{aligned}x(x + 1) + x &= 4 + x + x^2 \\x^2 + x + x - x - x^2 &= 4 \\x &= 4\end{aligned}$$

$$\begin{aligned}4(4 + 1) + 4 &= 4 + 4 + 4^2 \\20 + 4 &= 8 + 16 \\24 &= 24 \\&\text{Verificata}\end{aligned}$$

$$\begin{aligned}(x - 1)(x + 1) - 5 &= x(x + 1) - 2 \\x^2 - 1 - 5 &= x^2 + x - 2 \\-x &= -2 + 1 + 5 \\-x &= 4 \\x &= -4\end{aligned}$$

$$\begin{aligned}(-4 - 1)(-4 + 1) - 5 &= -4(-4 + 1) - 2 \\(-5)(-3) - 5 &= -4(-3) - 2 \\+15 - 5 &= +12 - 2 \\10 &= 10\end{aligned}$$

$$\begin{aligned}x + (x + 1) \cdot (x - 1) &= 5 + x^2 \\x + x^2 - 1 &= 5 + x^2 \\x &= 5 + 1 = 6\end{aligned}$$

$$\begin{aligned}x + (x + 1) \cdot (x - 1) &= 5 + x^2 \\6 + (6 + 1) \cdot (6 - 1) &= 5 + 6^2 \\6 + 7 \cdot (5) &= 5 + 36 \\6 + 35 &= 41 \\41 &= 41 \\&\text{Verificata}\end{aligned}$$

$$\begin{aligned}(x+6)(x-6)+30-9x &= 3(10-x^2)+4x^2 & (+2)(-10)+30-9(-4) &= 3(-6)+64 \\ x^2-36+30-9x &= 30-3x^2+4x^2 & -20+30+36 &= -18+64 \\ x^2+3x^2-4x^2-9x &= 30+6 & 46 &= 46 \\ -9x &= 36 & \text{Verificata} & \\ x &= -\frac{36}{9} = -4 & & \end{aligned}$$

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$$\begin{aligned}(x+1)^2 &= x^2-3 & (-2+1)^2 &= (-2)^2-3 \\ x^2+2x+1 &= x^2-3 & (-1)^2 &= 4-3 \\ 2x &= -3-1 & 1 &= 1 \\ x &= \frac{-4}{2} = -2 & \text{verificata} & \end{aligned}$$

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$$\begin{aligned}(3-x)\cdot(3+x)-5 &= x\cdot(2x+1)-3x\cdot(x-1) & (3-1)(3+1)-5 &= 1\cdot(2(1)+1)-3\cdot(1)(1-1) \\ 9-x^2-5 &= 2x^2+x-3x^2+3x & 2\cdot4-5 &= 1\cdot(3)+3\cdot(0) \\ -x^2-2x^2+3x^2-3x-x &= 5-9 & 8-5 &= 3 \\ -4x &= -4 & \mathbf{3} &= \mathbf{3} \\ \mathbf{x=1} & & \text{verificata} & \end{aligned}$$

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$$\begin{aligned}(x-2)^2-(x-4)\cdot(x+4)-3x\cdot(2x-1)-24 &= 3x\cdot(-2x+1)-4\cdot(x+1) \\ x^2-4x+4-x^2+16-6x^2+3x-24 &= -6x^2+3x-4x-4 \\ -4x+4+16+3x-24 &= +3x-4x-4 \\ +3x-3x &= -4-4-16+24 \\ 0x &= 0 \\ \text{indeterminata} & \end{aligned}$$

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$$\begin{aligned}3x\cdot(x+7)+(x-1)^2 &= 2x\cdot(2x-3)-14 & 3\cdot\left(-\frac{3}{5}\right)\cdot\left(-\frac{3}{5}+7\right)+\left(-\frac{3}{5}-1\right)^2 &= 2\left(-\frac{3}{5}\right)\cdot\left(2\left(-\frac{3}{5}\right)-3\right)-14 \\ 3x^2+21x+x^2-2x+1 &= 4x^2-6x-14 & -\frac{9}{5}\cdot\left(+\frac{32}{5}\right)+\left(-\frac{8}{5}\right)^2 &= \left(-\frac{6}{5}\right)\cdot\left(-\frac{6}{5}-3\right)-14 \\ 21x-2x+6x &= -1-14 & -\frac{288}{25}+\frac{64}{25} &= \left(-\frac{6}{5}\right)\cdot\left(-\frac{21}{5}\right)-14 \\ 25x &= -15 & -\frac{224}{25} &= \frac{126}{25}-14 \\ x &= -\frac{15}{25} = -\frac{3}{5} & -\frac{224}{25} &= \frac{126-350}{25} \\ & & -\frac{224}{25} &= -\frac{224}{25} \end{aligned}$$

$$\begin{aligned} (x-1)^2 + 2 \cdot (x-1) + 6x &= 5(x+1) + 1 - 5x + (x+1)^2 & (2-1)^2 + 2 \cdot (2-1) + 6 \cdot 2 &= 5 \cdot (2+1) + 1 - 5 \cdot 2 + (2+1)^2 \\ x^2 - 2x + 1 + 2x - 2 + 6x &= 5x + 5 + 1 - 5x + x^2 + 2x + 1 & (1)^2 + 2 \cdot (1) + 12 &= 5 \cdot (3) + 1 - 10 + (3)^2 \\ -2 + 6x &= +5 + 1 + 2x & 1 + 2 + 12 &= 15 + 1 - 10 + 9 \\ +6x - 2x &= +5 + 1 + 2 & 15 &= 15 \\ 4x &= 8 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} (x+3) \cdot (x-3) + (2x+3)^2 &= 5x^2 + 7 \cdot (x-5) & (-7+3) \cdot (-7-3) + (2 \cdot (-7)+3)^2 &= 5 \cdot (-7)^2 + 7 \cdot (-7-5) \\ x^2 - 9 + 4x^2 + 12x + 9 &= 5x^2 + 7x - 35 & (-4) \cdot (-10) + (-14+3)^2 &= 5 \cdot 49 + 7 \cdot (-12) \\ x^2 + 4x^2 - 5x^2 + 12x - 7x &= -35 + 9 - 9 & 40 + (-11)^2 &= 245 - 84 \\ +12x - 7x &= -35 & 40 + 121 &= 245 - 84 \\ 5x &= -35 & 161 &= 161 \\ x &= -7 \end{aligned}$$

$$\begin{aligned} 3x(1-x) - (x-3)^2 &= 12 - (2x+2)^2 & 3(1-1) - (1-3)^2 &= 12 - (2+2)^2 \\ 3x - 3x^2 - (x^2 - 6x + 9) &= 12 - (4x^2 + 8x + 4) & -(-2)^2 &= 12 - (+4)^2 \\ 3x - 3x^2 - x^2 + 6x - 9 &= 12 - 4x^2 - 8x - 4 & -4 &= 12 - 16 \\ 3x + 6x + 8x &= 12 - 4 + 9 & -4 &= -4 \\ 17x &= 17 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} (3x+1)(2x-3) &= 6x(x-1) - x \\ 6x^2 - 9x + 2x - 3 &= 6x^2 - 6x - x \\ -9x + 2x - 3 &= -6x - x \\ -9x + 2x + 6x + x &= +3 \\ 0x &= +3 \\ \text{impossibile} \end{aligned}$$

$$\begin{aligned} \frac{3 \cdot (x-3)^2}{4} + \frac{1}{4} + (x+2)^2 &= \frac{3}{4}x^2 - 6 + (x+1)(x-1) + 4x \\ \frac{3 \cdot (x^2 - 6x + 9)}{4} + \frac{1}{4} + (x^2 + 4x + 4) &= \frac{3}{4}x^2 - 6 + (x^2 - 1) + 4x \\ \frac{3x^2 - 18x + 27}{4} + \frac{1}{4} + x^2 + 4x + 4 &= \frac{3}{4}x^2 - 6 + x^2 - 1 + 4x \\ \frac{3}{4}x^2 - \frac{18}{4}x + \frac{27}{4} + \frac{1}{4} + 4x + 4 &= \frac{3}{4}x^2 - 6 - 1 + 4x \\ -\frac{18}{4}x + 4x - 4x &= -6 - 1 - \frac{27}{4} - \frac{1}{4} - 4 \\ -\frac{18}{4}x &= -11 - \frac{28}{4} \\ -\frac{18}{4}x &= -11 - 7 \\ x &= -18 \cdot \left(-\frac{4}{18}\right) = +4 \end{aligned}$$

$$\begin{aligned} \frac{3 \cdot (4-3)^2}{4} + \frac{1}{4} + (4+2)^2 &= \frac{3}{4}4^2 - 6 + (4+1)(4-1) + 16 \\ \frac{3}{4} + \frac{1}{4} + 36 &= \frac{3}{1}4 - 6 + (5)(3) + 16 \\ 1 + 36 &= 12 - 6 + 15 + 16 \\ 37 &= 37 \end{aligned}$$

$$\begin{aligned} \frac{(2-3x) \cdot (1+3x)}{9} + \frac{(3x-2)^2}{9} + \frac{5}{6} &= 2x - \frac{5x+1}{4} \\ \frac{(2-3x) \cdot (1+3x)}{9} + \frac{(3x-2)^2}{9} + \frac{5}{6} &= 2x - \frac{5x+1}{4} \\ \frac{2+6x-3x-9x^2}{9} + \frac{9x^2-12x+4}{9} + \frac{5}{6} &= 2x - \frac{5x+1}{4} \\ 4 \cdot (2+3x-9x^2) + 4 \cdot (9x^2-12x+4) + 30 &= 72x - 9 \cdot (5x+1) \\ 8+12x-36x^2+36x^2-48x+16+30 &= 72x-45x-9 \\ +12x-48x-72x+45x &= -9-8-16-30 \\ -63x &= -63 \\ x &= 1 \end{aligned}$$

Oppure

$$\begin{aligned} \frac{2+6x-3x-9x^2}{9} + \frac{9x^2-12x+4}{9} + \frac{5}{6} &= 2x - \frac{5x+1}{4} \\ \frac{2}{9} + \frac{3}{9}x - \frac{9}{9}x^2 + \frac{9}{9}x^2 - \frac{12}{9}x + \frac{4}{9} + \frac{5}{6} &= \frac{2}{1}x - \frac{5}{4}x - \frac{1}{4} \\ \frac{2}{9} + \frac{3}{9}x - \frac{12}{9}x + \frac{4}{9} + \frac{5}{6} &= \frac{2}{1}x - \frac{5}{4}x - \frac{1}{4} \\ +\frac{3}{9}x - \frac{12}{9}x - \frac{2}{1}x + \frac{5}{4}x &= -\frac{1}{4} - \frac{2}{9} - \frac{4}{9} - \frac{5}{6} \\ +12-48-72+45 & \quad -9-8-16-30 \\ \frac{36}{36}x &= \frac{-9-8-16-30}{36} \\ -\frac{63}{36}x &= -\frac{63}{36} \\ x &= -\frac{63}{36} \cdot \left(-\frac{36}{63}\right) = 1 \end{aligned}$$

$$\begin{aligned} \frac{(2-3x) \cdot (1+3x)}{9} + \frac{(3x-2)^2}{9} + \frac{5}{6} &= 2x - \frac{5x+1}{4} \\ \frac{(2-3) \cdot (1+3)}{9} + \frac{(3-2)^2}{9} + \frac{5}{6} &= 2 - \frac{5+1}{4} \\ \frac{(-1) \cdot (4)}{9} + \frac{(1)^2}{9} + \frac{5}{6} &= 2 - \frac{6}{4} \\ -\frac{4}{9} + \frac{1}{9} + \frac{5}{6} &= \frac{8-6}{4} \\ \frac{-8+2+15}{18} &= \frac{8-6}{4} \\ \frac{9}{18} &= \frac{2}{4} \\ \frac{1}{2} &= \frac{1}{2} \end{aligned}$$