

Equazioni di primo grado con frazioni. Livello intermedio. Completi di soluzione guidata.

First-Degree Equations

Résolution des équations du premier degré

- | | | |
|-----|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1. | $\frac{x-1}{3} - \frac{x+1}{2} = \frac{x-1}{2}$ | $\left[-\frac{1}{2}\right]$
soluzione |
| 2. | $\frac{x}{3} - \frac{x-1}{2} = -1 - \frac{x+2}{2} + 3$ | $\left[\frac{3}{2}\right]$
soluzione |
| 3. | $-\frac{x}{2} = \frac{x+2}{5} - \frac{7}{10}x$ | [imposs.]
soluzione |
| 4. | $\frac{x}{3} - \frac{x-4}{2} = \frac{6-x}{6} + 1$ | [indeterm.] (*)
soluzione |
| 5. | $\frac{3x-1}{6} + \frac{3x-1}{4} - \frac{4-x}{3} = \frac{x+2}{12} + \frac{2}{3} + \frac{11}{12}$ | $\left[\frac{7}{3}\right]$
soluzione |
| 6. | $\frac{3 \cdot (2x-5)}{4} - \frac{4 \cdot (x-2)}{5} + \frac{-10x+10}{10} = \frac{x-12}{10}$ | $\left[\frac{1}{8}\right]$
soluzione |
| 7. | $\frac{1-x}{4} - \frac{2x-1}{2} = \frac{3x-1}{4} - x - \frac{2}{3}$ | $\left[\frac{5}{3}\right]_{(*)}$
soluzione |
| 8. | $2x - \frac{2}{3} + x + \frac{2}{3} = -\frac{x+1}{3} - \frac{2}{9}$ | $\left[-\frac{1}{6}\right]$
soluzione |
| 9. | $\frac{3 \cdot (x-2)}{4} + \frac{1}{2}x - x = \frac{x-1}{2} - \frac{2 \cdot (x+3)}{4} + \frac{1}{6}$ | $\left[-\frac{4}{3}\right]$
soluzione |
| 10. | $2x - \frac{9}{4} + 3 \cdot (x-1) = 2 \cdot \left(x - \frac{1}{3}\right) - \frac{5}{6}$ | $\left[\frac{5}{4}\right]$
soluzione |
| 11. | $\frac{3}{4} \cdot \left(\frac{x+1}{2} - \frac{x+2}{6}\right) = x + \frac{3}{2}$ | $\left[-\frac{11}{6}\right]$
soluzione |
| 12. | $\frac{3}{4} \cdot (2x-5) - \frac{4 \cdot (x-2)}{5} - \frac{3x-3}{3} = \frac{x-12}{10}$ | $\left[\frac{1}{8}\right]$
soluzione |
| 13. | $\frac{1}{3} \cdot \left(\frac{3x-1}{2} - \frac{x+2}{3}\right) = \frac{1}{9}x - \frac{4}{9}$ | $\left[-\frac{1}{5}\right]$
soluzione |
| 14. | $\frac{3 \cdot (x+1) - x}{3} + 4x = 3 + \frac{2x-2}{3}$ | $\left[\frac{1}{3}\right]$
soluzione |

15. $\frac{3(x+1)}{2} + \frac{1}{2}x = \frac{5}{3} + \frac{x-1}{2}$

[soluzione](#)

16. $\frac{x-3}{2} + \frac{3x-2}{3} = \frac{5}{2}x - 1$

[soluzione](#)

17. $-\frac{3(-2x+1)}{10} - \frac{2-5x}{10} = \frac{1}{10}x - \frac{2(x+3)}{5}$

[soluzione](#)

18. $\frac{x+3}{5} = \frac{2x+1}{10} - \frac{3x+1}{2}$

[soluzione](#)

(*) Per gentile concessione della Commissione e-learning IPSSCART B. Stringher – Udine

Soluzioni

Metodo 1	Metodo 2
$\frac{x-1}{3} - \frac{x+1}{2} = \frac{x-1}{2}$ <p>Applico il 2° principio in modo da ottenere una equazione priva di frazioni</p> $6 \cdot \frac{x-1}{3} - 6 \cdot \frac{x+1}{2} = 6 \cdot \frac{x-1}{2}$ $2x - 2 - 3x - 3 = 3x - 3$ <p>Elisione dei termini uguali a sinistra e a destra</p> $2x - 2 - 3x = 3x$ <p>Sommo i monomi simili</p> $-2 - x = 3x$ <p>Applico la regola del trasporto (I principio)</p> $-x - 3x = 2$ <p>Sommo i monomi simili</p> $-4x = 2$ <p>Applico la regola del trasporto (II principio)</p> $x = -\frac{2}{4} = -\frac{1}{2}$	$\frac{x-1}{3} - \frac{x+1}{2} = \frac{x-1}{2}$ <p>Trasformo l'equazione in una a termini frazionari</p> $\frac{1}{3}x - \frac{1}{3} - \frac{1}{2}x - \frac{1}{2} = \frac{1}{2}x - \frac{1}{2}$ <p>Elisione dei termini uguali a sinistra e a destra</p> $\frac{1}{3}x - \frac{1}{3} - \frac{1}{2}x = \frac{1}{2}x$ <p>Applico la regola del trasporto</p> $\frac{1}{3}x - \frac{1}{2}x - \frac{1}{2}x = \frac{1}{3}$ <p>Sommo i monomi simili</p> $\frac{2-3-3}{6}x = \frac{1}{3}$ $-\frac{4}{6}x = \frac{1}{3}$ $x = \frac{1}{3} \cdot \left(-\frac{3}{2}\right) = -\frac{1}{2}$

Verifica

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

$$-\frac{1}{2} - 1 - \frac{1}{2} + 1 = -\frac{1}{2} - 1$$

$$-\frac{3}{2} \cdot \frac{1}{3} - \frac{1}{2} \cdot \frac{1}{2} = -\frac{3}{2} \cdot \frac{1}{2}$$

$$-\frac{1}{2} - \frac{1}{4} = -\frac{3}{4}$$

$$-\frac{3}{4} = -\frac{3}{4}$$

Metodo 1	Metodo 2
$\frac{x}{3} - \frac{x-1}{2} = -1 - \frac{x+2}{2} + 3$ <p>Applico il 2° principio in modo da ottenere una equazione priva di frazioni</p> $6 \cdot \frac{x}{3} - 6 \cdot \frac{x-1}{2} = 6 \cdot (-1) - 6 \cdot \frac{x+2}{2} + 6 \cdot 3$ $2x - 3x + 3 = -6 - 3x - 6 + 18$ <p>Principio della cancellazione di termini uguali ai due membri</p> $2x + 3 = -6 - 6 + 18$ <p>Applico la regola del trasporto (I principio)</p> $2x = 6 - 3$ $2x = 3$ <p>Applico la regola del trasporto (II principio)</p> $x = \frac{3}{2}$	$\frac{x}{3} - \frac{x-1}{2} = -1 - \frac{x+2}{2} + 3$ $\frac{1}{3}x - \frac{1}{2}x + \frac{1}{2} = -1 - \frac{1}{2}x - 1 + 3$ <p>Elisione dei termini uguali a sinistra e a destra</p> $\frac{1}{3}x + \frac{1}{2} = -1 - 1 + 3$ $\frac{1}{3}x = 1 - \frac{1}{2}$ $\frac{1}{3}x = \frac{1}{2}$ $x = \frac{1}{2} \cdot 3 = \frac{3}{2}$

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

$$\frac{\frac{3}{2}}{3} - \frac{\frac{3}{2}-1}{2} = -1 - \frac{\frac{3}{2}+2}{2} + 3$$

$$\frac{3}{2} \cdot \frac{1}{3} - \frac{1}{2} \cdot \frac{1}{2} = -1 - \frac{7}{2} \cdot \frac{1}{2} + 3$$

$$\frac{1}{2} - \frac{1}{4} = -1 - \frac{7}{4} + 3$$

$$\frac{1}{4} = \frac{1}{4}$$

$$-\frac{x}{2} = \frac{x+2}{5} - \frac{7}{10}x$$

$$-\frac{1}{2}x = \frac{1}{5}x + \frac{2}{5} - \frac{7}{10}x$$

$$-\frac{1}{2}x - \frac{1}{5}x + \frac{7}{10}x = +\frac{2}{5}$$

$$\frac{-5-2+7}{10}x = +\frac{2}{5}$$

$$0x = +\frac{2}{5}$$

impossibile

oppure

$$-\frac{x}{2} = \frac{x+2}{5} - \frac{7}{10}x$$

$$-5x = 2(x+2) - 7x$$

$$-5x = 2x + 4 - 7x$$

$$-5x - 2x + 7x = 4$$

$$0x = 4$$

impossibile

È possibile che una equazione non ammetta soluzioni, cioè non esiste alcun valore delle incognite che la verifichi. Si dice allora che la equazione è **impossibile**.

|| *Data l'equazione nella forma normale $ax = b$, si dice impossibile se $a = 0$ e $b \neq 0$.*

$$\frac{x}{3} - \frac{x-4}{2} = \frac{6-x}{6} + 1$$

$$2x - 3 \cdot (x-4) = 6 - x + 6$$

$$2x - 3x + 12 = 6 - x + 6$$

$$2x - 3x + x = 6 + 6 - 12$$

$$0x = 0$$

indeterminata

È possibile che una equazione ammetta un numero illimitato di soluzioni. Si dice allora che l'equazione è **indeterminata** (in effetti non è una equazione ma è una identità).

|| *Data l'equazione nella forma normale $ax = b$, si dice indeterminata se $a = 0$ e $b = 0$.*

$$\frac{3x-1}{6} + \frac{3x-1}{4} - \frac{4-x}{3} = \frac{x+2}{12} + \frac{2}{3} + \frac{11}{12}$$

$$2 \cdot (3x-1) + 3 \cdot (3x-1) - 4 \cdot (4-x) = x+2+4 \cdot 2+11$$

$$6x-2+9x-3-16+4x = x+2+8+11$$

$$6x+9x+4x-x = 2+8+11+2+3+16$$

$$18x = 42$$

$$x = \frac{42}{18} = \frac{7}{3}$$

Verifica

$$\frac{3 \cdot \left(\frac{7}{3}\right) - 1}{6} + \frac{3 \cdot \left(\frac{7}{3}\right) - 1}{4} - \frac{4 - \frac{7}{3}}{3} = \frac{\frac{7}{3} + 2}{12} + \frac{2}{3} + \frac{11}{12}$$

$$\frac{7-1}{6} + \frac{7-1}{4} - \frac{\frac{12-7}{3}}{3} = \frac{\frac{7+6}{3}}{12} + \frac{2}{3} + \frac{11}{12}$$

$$1 + \frac{6}{4} - \frac{5}{3} \cdot \frac{1}{3} = \frac{13}{3} \cdot \frac{1}{12} + \frac{2}{3} + \frac{11}{12}$$

$$\frac{18+27-10}{18} = \frac{13+24+33}{36}$$

$$\frac{35}{18} = \frac{75^{35}}{36_{18}}$$

$$\frac{3 \cdot (2x-5)}{4} - \frac{4 \cdot (x-2)}{5} + \frac{-10x+10}{10} = \frac{x-12}{10}$$

$$\begin{aligned} \frac{6x-15}{4} - \frac{4x-8}{5} + \frac{-10x+10}{10} &= \frac{x-12}{10} \\ + \frac{6}{4}x - \frac{15}{4} - \frac{4}{5}x + \frac{8}{5} - \frac{10}{10}x + \frac{10}{10} &= + \frac{1}{10}x - \frac{12}{10} \\ + \frac{6}{4}x - \frac{4}{5}x - \frac{10}{10}x - \frac{1}{10}x &= -\frac{12}{10} + \frac{15}{4} - \frac{8}{5} - \frac{10}{10} \\ + \frac{30-16-20-2}{20}x &= \frac{-24+75-32-20}{20} \end{aligned}$$

$$-\frac{8}{20}x = -\frac{1}{20}$$

$$\frac{8}{20}x = \frac{1}{20}$$

$$x = \frac{1}{20} \cdot \frac{20}{8} = \frac{1}{8}$$

Verifica

$$\frac{3 \cdot \left(2\frac{1}{8}-5\right)}{4} - \frac{4 \cdot \left(\frac{1}{8}-2\right)}{5} + \frac{-10\frac{1}{8}+10}{10} = \frac{\frac{1}{8}-12}{10}$$

$$\frac{3 \cdot \left(\frac{1}{4}-5\right)}{4} - \frac{4 \cdot \left(\frac{1}{8}-2\right)}{5} + \frac{-\frac{10}{8}+10}{10} = \frac{\frac{1}{8}-12}{10}$$

$$\frac{3 \cdot \left(\frac{1-20}{4}\right)}{4} - \frac{4 \cdot \left(\frac{1-16}{8}\right)}{5} + \frac{-10+80}{8} = \frac{1-96}{10}$$

$$\frac{3 \cdot \left(-\frac{19}{4}\right)}{4} - \frac{4 \cdot \left(-\frac{15}{8}\right)}{5} + \frac{70}{8} = \frac{-95}{10}$$

$$-\frac{57}{4} \cdot \left(\frac{1}{4}\right) - \left(-\frac{15}{2}\right) \cdot \left(\frac{1}{5}\right) + \frac{70}{8} \cdot \left(\frac{1}{10}\right) = -\frac{95}{8} \cdot \frac{1}{10}$$

$$-\frac{57}{16} + \frac{3}{2} + \frac{7}{4} = -\frac{19}{8} \cdot \frac{1}{2}$$

$$\frac{-57+24+14}{16} = -\frac{19}{16}$$

$$-\frac{19}{16} = -\frac{19}{16}$$

$$\frac{1-x}{4} - \frac{2x-1}{2} = \frac{3x-1}{4} - x - \frac{2}{3}$$

$$3 - 3x - 12x + 6 = 9x - 3 - 12x - 8$$

$$-3x - 12x - 9x + 12x = -3 - 8 - 3 - 6$$

$$-12x = -20$$

$$12x = 20$$

$$x = \frac{20}{12} = \frac{5}{3}$$

$$\frac{1 - \frac{5}{3}}{4} - \frac{2 \cdot \frac{5}{3} - 1}{2} = \frac{3 \cdot \frac{5}{3} - 1}{4} - \frac{5}{3} - \frac{2}{3}$$

$$\frac{\frac{2}{3}}{4} - \frac{\frac{10}{3} - 1}{2} = \frac{5 - 1}{4} - \frac{5}{3} - \frac{2}{3}$$

$$-\frac{2}{3} \cdot \frac{1}{4} - \frac{\frac{7}{3}}{2} = \frac{4}{4} - \frac{5}{3} - \frac{2}{3}$$

$$-\frac{1}{6} - \frac{7}{3} \cdot \frac{1}{2} = 1 - \frac{5}{3} - \frac{2}{3}$$

$$-\frac{1}{6} - \frac{7}{6} = \frac{3}{3} - \frac{5}{3} - \frac{2}{3}$$

$$-\frac{8}{6} = -\frac{4}{3}$$

$$2x - \frac{2}{3} + x + \frac{2}{3} = -\frac{x+1}{3} - \frac{2}{9}$$

$$2x + x = -\frac{x+1}{3} - \frac{2}{9}$$

$$3x = -\frac{x+1}{3} - \frac{2}{9}$$

$$27x = -3 \cdot (x+1) - 2$$

$$27x = -3x - 3 - 2$$

$$27x + 3x = -5$$

$$x = -\frac{5}{30} = -\frac{1}{6}$$

$$2x - \frac{2}{3} + x + \frac{2}{3} = -\frac{x+1}{3} - \frac{2}{9}$$

$$2 \cdot \left(-\frac{1}{6}\right) - \frac{1}{6} = -\frac{-\frac{1}{6} + 1}{3} - \frac{2}{9}$$

$$-\frac{1}{3} - \frac{1}{6} = -\frac{-1+6}{6} - \frac{2}{9}$$

$$\frac{-2-1}{6} = -\left(+\frac{5}{6}\right) \cdot \frac{1}{3} - \frac{2}{9}$$

$$-\frac{3}{6} = -\frac{5}{18} - \frac{2}{9}$$

$$-\frac{1}{2} = \frac{-5-4}{18}$$

$$-\frac{1}{2} = -\frac{9}{18}$$

$$\frac{3 \cdot (x-2)}{4} + \frac{1}{2}x - x = \frac{x-1}{2} - \frac{2 \cdot (x+3)}{4} + \frac{1}{6}$$

$$\frac{3 \cdot 3 \cdot (x-2) + 6x - 12x}{12} = \frac{6 \cdot (x-1) - 3 \cdot 2 \cdot (x+3) + 2}{12}$$

$$9 \cdot (x-2) - 6x = 6x - 6 - 6 \cdot (x+3) + 2$$

$$9x - 18 - 6x = 6x - 6 - 6x - 18 + 2$$

$$9x - 6x = -6 + 2$$

$$3x = -4$$

$$x = -\frac{4}{3}$$

$$3 \cdot \left(-\frac{4}{3} - 2\right) + \frac{1}{2} \left(-\frac{4}{3}\right) - \left(-\frac{4}{3}\right) = \frac{-\frac{4}{3} - 1}{2} - \frac{2 \cdot \left(-\frac{4}{3} + 3\right)}{4} + \frac{1}{6}$$

$$3 \cdot \left(-\frac{10}{3}\right) - \frac{2}{3} + \frac{4}{3} = \frac{-\frac{7}{3}}{2} - \frac{2 \cdot \left(+\frac{5}{3}\right)}{4} + \frac{1}{6}$$

$$-\frac{10}{4} - \frac{2}{3} + \frac{4}{3} = -\frac{7}{6} - \frac{\frac{10}{3}}{4} + \frac{1}{6}$$

$$-\frac{30 - 8 + 16}{12} = -\frac{7}{6} - \frac{10}{12} + \frac{1}{6}$$

$$-\frac{22}{12} = \frac{-14 - 10 + 2}{12}$$

$$-\frac{11}{6} = -\frac{22}{12}$$

$$2x - \frac{9}{4} + 3 \cdot (x-1) = 2 \cdot \left(x - \frac{1}{3}\right) - \frac{5}{6}$$

$$2x - \frac{9}{4} + 3x - 3 = 2x - \frac{2}{3} - \frac{5}{6}$$

$$3x = -\frac{2}{3} - \frac{5}{6} + \frac{9}{4} + 3$$

$$3x = \frac{-8 - 10 + 27 + 36}{12}$$

$$3x = \frac{45}{12}$$

$$x = \frac{45}{12} \cdot \frac{1}{3} =$$

$$x = \frac{15}{12} = \frac{5}{4}$$

$$2 \cdot \frac{5}{4} - \frac{9}{4} + 3 \cdot \left(\frac{5}{4} - 1\right) = 2 \cdot \left(\frac{5}{4} - \frac{1}{3}\right) - \frac{5}{6}$$

$$\frac{5}{2} - \frac{9}{4} + 3 \cdot \left(\frac{1}{4}\right) = 2 \cdot \left(\frac{15 - 4}{12}\right) - \frac{5}{6}$$

$$\frac{5}{2} - \frac{9}{4} + \frac{3}{4} = \frac{11}{6} - \frac{5}{6}$$

$$\frac{30 - 27 + 9}{12} = \frac{6}{6}$$

$$\frac{12}{12} = \frac{6}{6}$$

$$\frac{3}{4} \cdot \left(\frac{x+1}{2} - \frac{x+2}{6} \right) = x + \frac{3}{2}$$

$$\frac{3}{4} \cdot \left(\frac{1}{2}x + \frac{1}{2} - \frac{1}{6}x - \frac{2}{6} \right) = x + \frac{3}{2}$$

$$\frac{3}{4} \cdot \left(\frac{3-1}{6}x + \frac{3-2}{6} \right) = x + \frac{3}{2}$$

$$\frac{3}{4} \cdot \left(\frac{2}{6}x + \frac{1}{6} \right) = x + \frac{3}{2}$$

$$\frac{1}{4}x + \frac{1}{8} = x + \frac{3}{2}$$

$$\frac{1}{4}x - x = \frac{3}{2} - \frac{1}{8}$$

$$-\frac{3}{4}x = \frac{11}{8}$$

$$x = \frac{11}{8} \cdot \left(-\frac{4}{3} \right) = -\frac{11}{6}$$

Verifica

$$\frac{3}{4} \cdot \left(\frac{-\frac{11}{6} + 1}{2} - \frac{-\frac{11}{6} + 2}{6} \right) = -\frac{11}{6} + \frac{3}{2}$$

$$\frac{3}{4} \cdot \left(-\frac{5}{6} \cdot \frac{1}{2} - \frac{1}{6} \cdot \frac{1}{6} \right) = \frac{-11+9}{6}$$

$$\frac{3}{4} \cdot \left(-\frac{5}{12} - \frac{1}{36} \right) = -\frac{2}{6}$$

$$\frac{3}{4} \cdot \left(-\frac{16}{36} \right) = -\frac{1}{3}$$

$$\frac{1}{1} \cdot \left(-\frac{4}{12} \right) = -\frac{1}{3}$$

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

$$\frac{3}{4} \cdot (2x - 5) - \frac{4 \cdot (x - 2)}{5} - \frac{3x - 3}{3} = \frac{x - 12}{10}$$

$$\frac{6}{4}x - \frac{15}{4} - \frac{4}{5}x + \frac{8}{5} - x + 1 = \frac{1}{10}x - \frac{12}{10}$$

$$30x - 75 - 16x + 32 - 20x + 20 = 2x - 24$$

$$30x - 16x - 20x - 2x = -24 + 75 - 32 - 20$$

$$30x - 38x = 51 - 52$$

$$-8x = -1$$

$$8x = 1$$

$$x = \frac{1}{8}$$

Verifica

$$\frac{3}{4} \cdot \left(2 \left(\frac{1}{8} \right) - 5 \right) - \frac{4 \cdot \left(\frac{1}{8} - 2 \right)}{5} - \frac{3 \left(\frac{1}{8} \right) - 3}{3} = \frac{\frac{1}{8} - 12}{10}$$

$$\frac{3}{4} \cdot \left(\frac{1}{4} - 5 \right) - \frac{4 \cdot \left(\frac{1 - 16}{8} \right)}{5} - \frac{\frac{3}{8} - 3}{3} = \frac{1 - 96}{10}$$

$$\frac{3}{4} \cdot \left(\frac{1 - 20}{4} \right) - \frac{4 \cdot \left(-\frac{15}{8} \right)}{5} - \frac{3 - 24}{3} = \frac{-95}{10}$$

$$\frac{3}{4} \cdot \left(-\frac{19}{4} \right) - \frac{-\frac{15}{2}}{5} - \frac{-\frac{21}{8}}{3} = -\frac{95}{8} \cdot \frac{1}{10}$$

$$-\frac{57}{16} - \left(-\frac{15}{2} \right) \cdot \frac{1}{5} - \left(-\frac{21}{8} \right) \cdot \frac{1}{3} = -\frac{19}{8} \cdot \frac{1}{2}$$

$$-\frac{57}{16} - \left(-\frac{3}{2} \right) - \left(-\frac{7}{8} \right) = -\frac{19}{16}$$

$$-\frac{57}{16} + \frac{3}{2} + \frac{7}{8} = -\frac{19}{16}$$

$$\frac{-57 + 24 + 14}{16} = -\frac{19}{16}$$

$$-\frac{19}{16} = -\frac{19}{16}$$

$$\frac{1}{3} \cdot \left(\frac{3x-1}{2} - \frac{x+2}{3} \right) = \frac{1}{9}x - \frac{4}{9}$$

$$\frac{1}{3} \cdot \left(\frac{3}{2}x - \frac{1}{2} - \frac{1}{3}x - \frac{2}{3} \right) = \frac{1}{9}x - \frac{4}{9}$$

$$\frac{1}{2}x - \frac{1}{6} - \frac{1}{9}x - \frac{2}{9} = \frac{1}{9}x - \frac{4}{9}$$

$$\frac{1}{2}x - \frac{1}{9}x - \frac{1}{9}x = -\frac{4}{9} + \frac{1}{6} + \frac{2}{9}$$

$$\frac{9-2-2}{18}x = \frac{-8+3+4}{18}$$

$$\frac{5}{18}x = -\frac{1}{18}$$

$$x = -\frac{1}{18} \cdot \frac{18}{5} = -\frac{1}{5}$$

Verifica

$$\frac{1}{3} \cdot \left(\frac{3 \cdot \left(-\frac{1}{5} \right) - 1}{2} - \frac{-\frac{1}{5} + 2}{3} \right) = \frac{1}{9} \cdot \left(-\frac{1}{5} \right) - \frac{4}{9}$$

$$\frac{1}{3} \cdot \left(\frac{-\frac{3}{5} - 1}{2} - \frac{\frac{9}{5}}{3} \right) = -\frac{1}{45} - \frac{4}{9}$$

$$\frac{1}{3} \cdot \left(-\frac{8}{5} \cdot \frac{1}{2} - \frac{9}{5} \cdot \frac{1}{3} \right) = \frac{-1-20}{45}$$

$$\frac{1}{3} \cdot \left(-\frac{4}{5} - \frac{3}{5} \right) = -\frac{21}{45}$$

$$\frac{1}{3} \cdot \left(-\frac{7}{5} \right) = -\frac{7}{15}$$

$$-\frac{7}{15} = -\frac{7}{15}$$

$$\frac{3 \cdot (x+1) - x}{3} + 4x = 3 + \frac{2x-2}{3}$$

$$\frac{3 \cdot (x+1) - x + 12x}{3} = \frac{9 + 2x - 2}{3}$$

$$3 \cdot (x+1) - x + 12x = 9 + 2x - 2$$

$$3x + 3 - x + 12x = 2x + 7$$

$$3x - x + 12x - 2x = 7 - 3$$

$$12x = 4$$

$$x = \frac{4}{12} = \frac{1}{3}$$

Verifica

$$\frac{3 \cdot \left(\frac{1}{3} + 1\right) - \left(\frac{1}{3}\right)}{3} + 4 \cdot \left(\frac{1}{3}\right) = 3 + \frac{2 \cdot \left(\frac{1}{3}\right) - 2}{3}$$

$$\frac{3 \cdot \frac{4}{3} - \frac{1}{3}}{3} + \frac{4}{3} = 3 + \frac{\frac{2}{3} - 2}{3}$$

$$\frac{4 - \frac{1}{3}}{3} + \frac{4}{3} = 3 + \frac{-\frac{4}{3}}{3}$$

$$\frac{11}{3} - \frac{1}{9} + \frac{4}{3} = 3 - \frac{4}{9}$$

$$\frac{11+12}{9} = \frac{27-4}{9}$$

$$\frac{23}{9} = \frac{23}{9}$$

$$\frac{3(x+1)}{2} + \frac{1}{2}x = \frac{5}{3} + \frac{x-1}{2}$$

$$6 \cdot \frac{3(x+1)}{2} + 6 \cdot \frac{1}{2}x = 6 \cdot \frac{5}{3} + 6 \cdot \frac{x-1}{2}$$

$$9x + 9 + 3x = 10 + 3x - 3$$

$$9x + 9 = 10 - 3$$

$$9x = 10 - 3 - 9$$

$$9x = -2$$

$$x = -\frac{2}{9}$$

Verifica

$$\frac{3\left(-\frac{2}{9}+1\right)}{2} + \frac{1}{2} \cdot \left(-\frac{2}{9}\right) = \frac{5}{3} + \frac{-\frac{2}{9}-1}{2}$$

$$\frac{3\left(\frac{7}{9}\right)}{2} - \frac{1}{9} = \frac{5}{3} - \frac{11}{9} \cdot \frac{1}{2}$$

$$\frac{7}{3} \cdot \frac{1}{2} - \frac{1}{9} = \frac{5}{3} - \frac{11}{18}$$

$$\frac{7}{6} - \frac{1}{9} = \frac{5}{3} - \frac{11}{18}$$

$$\frac{21-2}{18} = \frac{30-11}{18}$$

$$\frac{19}{18} = \frac{19}{18}$$

$$\frac{x-3}{2} + \frac{3x-2}{3} = \frac{5}{2}x - 1$$

$$\frac{3(x-3) + 2(3x-2) = 3(5x) - 6}{6}$$

$$3x - 9 + 6x - 4 = 15x - 6$$

$$3x + 6x - 15x = -6 + 9 + 4$$

$$-6x = 7$$

$$x = -\frac{7}{6}$$

Verifica

$$-\frac{7}{6} - 3 + \frac{3(-\frac{7}{6}) - 2}{3} = \frac{5}{2}\left(-\frac{7}{6}\right) - 1$$

$$\left(\frac{-7-18}{6}\right)\left(\frac{1}{2}\right) + \left(\frac{-7-4}{2}\right)\left(\frac{1}{3}\right) = -\frac{35}{12} - 1$$

$$\left(-\frac{25}{6}\right)\left(\frac{1}{2}\right) + \left(-\frac{11}{2}\right)\left(\frac{1}{3}\right) = \frac{-35-12}{12}$$

$$-\frac{25}{12} - \frac{11}{6} = -\frac{47}{12}$$

$$\frac{-25-22}{12} = -\frac{47}{12}$$

$$-\frac{47}{12} = -\frac{47}{12}$$

$$-\frac{3(-2x+1)}{10} - \frac{2-5x}{10} = \frac{1}{10}x - \frac{2(x+3)}{5}$$

$$-10 \cdot \frac{3(-2x+1)}{10} - 10 \cdot \frac{2-5x}{10} = 10 \cdot \frac{1}{10}x - 10 \cdot \frac{2(x+3)}{5}$$

$$-3(-2x+1) - 2 + 5x = x - 4(x+3)$$

$$6x - 3 - 2 + 5x = x - 4x - 12$$

$$6x + 5x - x + 4x = -12 + 3 + 2$$

$$14x = -7$$

$$x = -\frac{7}{14} = -\frac{1}{2}$$

verifica

$$-\frac{3(-2x+1)}{10} - \frac{2-5x}{10} = \frac{1}{10}x - \frac{2(x+3)}{5}$$

$$-\frac{3\left(-2\left(-\frac{1}{2}\right)+1\right)}{10} - \frac{2-5\left(-\frac{1}{2}\right)}{10} = \frac{1}{10}\left(-\frac{1}{2}\right) - \frac{2\left(-\frac{1}{2}+3\right)}{5}$$

$$-\frac{3(1+1)}{10} - \frac{2+\frac{5}{2}}{10} = -\frac{1}{20} - \frac{2\left(\frac{5}{2}\right)}{5}$$

$$-\frac{6}{10} - \frac{\frac{9}{2}}{10} = -\frac{1}{20} - \frac{5}{5}$$

$$-\frac{3}{5} - \frac{9}{2}\left(\frac{1}{10}\right) = -\frac{1}{20} - 1$$

$$-\frac{3}{5} - \frac{9}{20} = -\frac{1}{20} - 1$$

$$\frac{-12-9}{20} = \frac{-1-20}{20}$$

$$-\frac{21}{20} = -\frac{21}{20}$$

$$\frac{x+3}{5} = \frac{2x+1}{10} - \frac{3x+1}{2}$$

$$\frac{x+3}{5} \cdot 10 = \frac{2x+1}{10} \cdot 10 - \frac{3x+1}{2} \cdot 10$$


$$2x+6 = 2x+1 - 15x-5$$

$$6 = 1 - 15x - 5$$


$$15x = 1 - 5 - 6$$


$$x = -\frac{10}{15} = -\frac{2}{3}$$


Keywords

 *Algebra, equazioni, equazioni di primo grado, esercizi con soluzioni*

 *Algebra, equation, linear equations, Algebraic Equations solved, exercises with solution*

 *Algebra, ecuación, ecuaciones de primero grado*

 *Algèbre, équations, système d'équations, équations en première*

 *Algebra, reactievergelijking, Gleichung*

Arabic: مُعادلة

Chinese (Simplified): 反应式

Chinese (Traditional): 反應式

Czech: rovnice

Danish: regnestykke; ligning

Estonian: võrrand

Finnish: kaava

German: die Gleichung

Greek: εξίσωση (χημική αντίδραση)

Hungarian: egyenlet

Icelandic: efnajafna

Indonesian: persamaan

Japanese: 方程式

Korean: 반응식

Latvian: vienādojums

Lithuanian: formulė

Norwegian: likning

Polish: równanie, wzór

Portuguese: equação

Romanian: ecuație

Russian: формула реакции

Slovak: rovnica

Slovenian: enačba

Swedish: kemisk formel

Turkish: denklem