Equazioni di primo grado con frazioni. Livello intermedio. Raccolta uno.

Completi di soluzione guidata. *First-Degree Equations*
Résolution des équations du premier degré

1. $\frac{x-1}{2}-\frac{x+1}{2}=x-1$ [0] soluzione

2. $x-\frac{x-1}{3}=-1-\frac{x+2}{2}$ [-2] soluzione

3. $\frac{3x-2}{3}+\frac{3+x}{12}=\frac{3x+3}{4}-\frac{1}{6}$ [3] soluzione

4. $\frac{2-x}{2}+\frac{3-2x}{11}=\frac{x+1}{3}+5$ [-4] soluzione

5. $\frac{5x-3}{2}+\frac{1}{5}=\frac{x-7}{2}-\frac{7-x}{5}$ [-2] soluzione

6. $\frac{1-2x}{2}+\frac{4-4x}{10}=\frac{2x-13}{10}-\frac{4x-3}{5}$ [2] soluzione

7. $\frac{5x-6}{4}+1-\frac{2x+1}{3}=x$ [-2] soluzione

8. $\frac{1}{6}\cdot(4+x)=1-\frac{1}{9}\cdot(1-2x)$ [-4] soluzione

9. $\frac{1+3x}{2}+\frac{1}{3}=\frac{x+6}{6}+\frac{x-2}{2}$ [-1] soluzione

10. $\frac{2x-3}{6}+\frac{21-x}{3}-\frac{5}{6}=\frac{21-x}{3}-\frac{x+1}{12}$ [3] soluzione

11. $4x-\frac{x+3}{4}-\frac{5\cdot(x+1)}{3}=\frac{3\cdot(x-2)}{2}-\frac{4\cdot(x+1)}{3}$ [-1] soluzione

12. $\frac{x+1}{2}-\frac{3-x}{4}=2-\frac{1}{3}(6-x)$ [3] soluzione

13. $\frac{3\cdot(2x+1)}{5}-\frac{3\cdot(1+x)}{15}=2+\frac{15x-2}{20}$ [6] soluzione

14. $3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)-(x-2)-\frac{1}{4}=-\frac{2x+1}{4}$ [-2] soluzione

15. $\frac{2x+1}{4}-(x-2)=-3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)+\frac{1}{4}$ [-2] soluzione

16. $\frac{3\cdot(2x-1)}{4}-\frac{5\cdot(3x-5)}{3}=\frac{7-4x}{12}+\frac{2}{3}$ [2] soluzione

17. $\frac{1}{3}\left(x-\frac{1}{2}\right)-\frac{1}{2}\left(x-\frac{1}{3}\right)=\frac{x-4}{2}$ [3] (*) soluzione

18. $\frac{3x-1}{4}-\frac{1}{2}=\frac{2(2x+3)}{5}-\frac{x+3}{2}$ [1] soluzione

19. $\frac{2x+3}{2}-\frac{3(x+2)}{4}=\frac{1}{3}-\frac{2-x}{3}$ [4] soluzione

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

21. $\frac{x-7}{3}-\frac{2x-1}{15}-\frac{8}{15}=\frac{3x-1}{10}-\frac{x-1}{2}$ [8] soluzione

22. $\frac{13x-2}{12}+\frac{2-3x}{10}-\frac{x+1}{5}=1$ [2] soluzione

23. $\frac{3x-9}{2}+3x-3=\frac{x+1}{4}+x+2$ [3] soluzione

24. $\frac{3\cdot(x+1)-x}{3}+4x=3+\frac{2x-2}{3}$ $\left[\frac{1}{3}\right]$ soluzione

25. $\frac{x-2}{5}-\frac{2x+1}{3}+\frac{2x+6}{15}=0$ [-1] soluzione

26. $\frac{2(x+2)}{3}-\frac{3x-1}{2}=1+\frac{2(x-1)}{3}$ [1] soluzione

27. $\frac{2(x-5)}{3}-\frac{2x+3}{5}=\frac{1}{3}x+\frac{2(-x-25)}{15}$ [9] soluzione

28. $4+\frac{1-x}{3}=x-\frac{x+3}{2}$ [2] soluzione

29. $\frac{9-x}{2}+\frac{1}{20}x=\frac{29}{20}-\frac{x-5}{2}+\frac{x-1}{5}$ [5] soluzione

30. $\frac{x+6}{2}+\frac{7}{6}x=\frac{2x+3}{3}-3$ soluzione

31. $x+\frac{x+2}{4}+\frac{1}{3}x=3+\frac{1}{3}x$ soluzione

32. $-\frac{x+6}{2}+\frac{1}{3}x=-\frac{2x+3}{3}+\frac{1}{2}$ soluzione

33. $\frac{1}{2}x-\frac{2(x+6)}{3}=-\frac{1}{3}-\frac{2x+3}{2}+x$ soluzione

34. $\frac{2x-3}{4}+\frac{2x+3}{3}=1+\frac{5}{12}x$ soluzione

35. $\frac{3\cdot(x-2)}{2}-\frac{4\cdot(x+1)}{3}=4x-\frac{x+3}{4}-\frac{5\cdot(x+1)}{3}$ soluzione

36. $\frac{x+2}{6}=\frac{x+2}{3}-\frac{4x+5}{6}-\frac{1-x}{2}-x$ soluzione

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

Soluzioni

Metodo 1	Metodo 2
$\frac{x-1}{2}-\frac{x+1}{2}=x-1$ Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi $2\cdot\frac{x-1}{2}-2\cdot\frac{x+1}{2}=2\cdot x-2\cdot 1$ $x-1-x-1=2x-2$ Elimino gli opposti e sommo i monomi simili $-2=2x-2$ $-2x=2-2$ $-2x=0$ $x=0$ NB sarebbe stato possibile anche elidere i due termini uguali a sinistra e destra del segno di uguaglianza (elisione)	$\frac{x-1}{2}-\frac{x+1}{2}=x-1$ Trasformo l'equazione in una a termini frazionari $\frac{1}{2}x-\frac{1}{2}-\frac{1}{2}x-\frac{1}{2}=x-1$ Elimino gli opposti e sommo i monomi simili $\frac{-1-1}{2}=x-1$ $-1=x-1$ $x-1=-1$ $x=-1+1=0$ NB sarebbe stato possibile anche elidere i due termini uguali a sinistra e destra del segno di uguaglianza (elisione)

Verifica

$$\frac{x-1}{2}-\frac{x+1}{2}=x-1$$
$$\frac{0-1}{2}-\frac{0+1}{2}=0-1$$
$$-\frac{1}{2}-\frac{1}{2}=-1$$
$$-\frac{2}{2}=-1$$
$$-1=-1$$

Metodo 1	Metodo 2
$x-\frac{x-1}{3}=-1-\frac{x+2}{2}$ Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi $6\cdot x-6\cdot\frac{x-1}{3}=6\cdot(-1)-6\cdot\frac{x+2}{2}$ $6x-2(x-1)=-6-3(x+2)$ $6x-2x+2=-6-3x-6$ Sommo i monomi simili $4x+2=-3x-12$ Applico la regola del trasporto $4x+3x=-2-12$ $7x=-14$ $x=-\frac{14}{7}=-2$	$x-\frac{x-1}{3}=-1-\frac{x+2}{2}$ Trasformo l'equazione in una a termini frazionari $x-\frac{1}{3}x+\frac{1}{3}=-1-\frac{1}{2}x-\frac{2}{2}$ Applico la regola del trasporto $x-\frac{1}{3}x+\frac{1}{2}x=-1-1-\frac{1}{3}$ Sommo i monomi simili $\frac{6-2+3}{6}x=\frac{-3-3-1}{3}$ $\frac{7}{6}x=-\frac{7}{3}$ $x=-\frac{7}{3}\cdot\frac{6}{7}=-\frac{6}{3}=-2$

Verifica

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

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

$-2+\frac{3}{3}=-1-\frac{0}{2}$

$-2+1=-1$

$-1=-1$

Metodo 1	Metodo 2
$\frac{3x-2}{3}+\frac{3+x}{12}=\frac{3x+3}{4}-\frac{1}{6}$ Trasformo l'equazione in una a termini frazionari $x-\frac{2}{3}+\frac{3}{12}+\frac{1}{12}x=\frac{3}{4}x+\frac{3}{4}-\frac{1}{6}$ $x+\frac{1}{12}x-\frac{3}{4}x=+\frac{3}{4}-\frac{1}{6}+\frac{2}{3}-\frac{3}{12}$ $\frac{12+1-9}{12}x=\frac{9-2+8-3}{12}$ $\frac{4}{12}x=\frac{12}{12}$ $x=\frac{12}{12}\cdot\frac{12}{4}$ $x=3$	$\frac{3x-2}{3}+\frac{3+x}{12}=\frac{3x+3}{4}-\frac{1}{6}$ Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi $12\cdot\frac{3x-2}{3}+12\cdot\frac{3+x}{12}=12\cdot\frac{3x+3}{4}-12\cdot\frac{1}{6}$ $4\cdot(3x-2)+3+x=3\cdot(3x+3)-2$ $12x-8+3+x=9x+9-2$ $12x+x-9x=9-2+8-3$ $4x=12$ $x=\frac{12}{4}=3$

Verifica

$\frac{3\cdot3-2}{3}+\frac{3+3}{12}=\frac{3\cdot3+3}{4}-\frac{1}{6}$

$\frac{9-2}{3}+\frac{6}{12}=\frac{9+3}{4}-\frac{1}{6}$

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

$\frac{14+3}{6}=\frac{18-1}{6}$

$\frac{17}{6}=\frac{17}{6}$

Metodo 1	Metodo 2
$\frac{2-x}{2}+\frac{3-2x}{11}=\frac{x+1}{3}+5$ Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi $\frac{33\cdot(2-x)+6\cdot(3-2x)=22\cdot(x+1)+66\cdot 5}{66}$ $66-33x+18-12x=22x+22+330$ $-33x-12x-22x=+22+330-66-18$ $-45x-22x=+352-84$ $-67x=268$ $x=\frac{268}{-67}=-4$	$\frac{2-x}{2}+\frac{3-2x}{11}=\frac{x+1}{3}+5$ $1-\frac{1}{2}x+\frac{3}{11}-\frac{2}{11}x=\frac{1}{3}x+\frac{1}{3}+5$ $-\frac{1}{2}x-\frac{2}{11}x-\frac{1}{3}x=\frac{1}{3}+5-\frac{3}{11}-1$ $\frac{-33-12-22}{66}x=\frac{22+330-18-66}{66}$ $-\frac{67}{66}x=\frac{268}{66}$ $x=\frac{268}{66}\cdot\left(-\frac{66}{67}\right)=-4$

Verifica

$\frac{2-x}{2}+\frac{3-2x}{11}=\frac{x+1}{3}+5$

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

$\frac{6}{2}+\frac{3+8}{11}=-\frac{3}{3}+5$

$3+\frac{11}{11}=-1+5$

$4=4$

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

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$10\cdot\frac{25x-15+2}{10}=\frac{5x-35-14+2x}{10}\cdot 10$$
$$25x-15+2=5x-35-14+2x$$
$$25x-5x-2x=-35-14+15-2$$
$$20x-2x=-35+1-2$$
$$\frac{18}{18}x=-\frac{36}{18}x$$
$$x=-2$$

$$\frac{5\cdot(-2)-3}{2}+\frac{1}{5}=\frac{(-2)-7}{2}-\frac{7-(-2)}{5}$$
$$\frac{-10-3}{2}+\frac{1}{5}=-\frac{9}{2}-\frac{7+2}{5}$$
$$-\frac{13}{2}+\frac{1}{5}=-\frac{9}{2}-\frac{9}{5}$$
$$\frac{-65+2}{10}=\frac{-45-18}{10}$$
$$-\frac{63}{10}=-\frac{63}{10}$$

$$\frac{1-2x}{2}+\frac{4-4x}{10}=\frac{2x-13}{10}-\frac{4x-3}{5}$$

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$5-10x+4-4x=2x-13-8x+6$$
$$-10x-4x-2x+8x=-13+6-5-4$$
$$8x-16x=6-22$$
$$-8x=-16$$
$$8x=16$$
$$x=\frac{16}{8}=2$$

$$\frac{1-4}{2}+\frac{4-8}{10}=\frac{4-13}{10}-\frac{8-3}{5}$$
$$-\frac{3}{2}-\frac{4}{10}=-\frac{9}{10}-\frac{5}{5}$$
$$\frac{-15-4}{10}=\frac{-9-10}{10}$$
$$-\frac{19}{10}=-\frac{19}{10}$$

Verificata

$$\frac{5x-6}{4}+1-\frac{2x+1}{3}=x$$
$$\frac{5}{4}x-\frac{6}{4}+1-\frac{2}{3}x-\frac{1}{3}=x$$
$$\frac{5}{4}x-\frac{2}{3}x-x=-1+\frac{6}{4}+\frac{1}{3}$$
$$\frac{15-8-12}{12}x=\frac{-12+18+4}{12}$$
$$-\frac{5}{12}x=\frac{10}{12}$$
$$x=\frac{10}{12}\cdot\left(-\frac{12}{5}\right)=-2$$

$$\frac{5\cdot(-2)-6}{4}+1-\frac{2\cdot(-2)+1}{3}=-2$$
$$\frac{-10-6}{4}+1-\frac{-4+1}{3}=-2$$
$$-\frac{16}{4}+1-\left(-\frac{3}{3}\right)=-2$$
$$-4+1+1=-2$$
$$-2=-2$$

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

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$18\cdot\frac{1}{6}\cdot(4+x)=18\cdot1-18\cdot\frac{1}{9}\cdot(1-2x)$$
$$3\cdot(4+x)=18-2\cdot(1-2x)$$
$$12+3x=18-2+4x$$
$$3x-4x=18-2-12$$
$$-x=4$$
$$x=-4$$

$$\frac{1}{6}\cdot(4-4)=1-\frac{1}{9}\cdot(1+8)$$
$$0=1-1$$
$$0=0$$

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

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

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

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

$$\frac{2x-3}{6}+\frac{21-x}{3}-\frac{5}{6}=\frac{21-x}{3}-\frac{x+1}{12}$$

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$2(2x-3)-2(5)=-(x+1)$$
$$4x-6-10=-x-1$$
$$4x+x=-1+6+10$$
$$5x=15$$
$$x=\frac{15}{5}=3$$

$$\frac{(6-3)}{6}+\frac{21-3}{3}-\frac{5}{6}=\frac{21-3}{3}-\frac{3+1}{12}$$
$$\frac{3}{6}+\frac{18}{3}-\frac{5}{6}=\frac{18}{3}-\frac{4}{12}$$
$$\frac{3}{6}+6-\frac{5}{6}=\frac{72-4}{12}$$
$$\frac{3+36-5}{6}=\frac{68}{12}$$
$$\frac{34}{6}=\frac{68}{12}$$
$$\frac{34}{6}=\frac{34}{6}$$

Verificata

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

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$12\cdot 4x-12^{3}\cdot\frac{x+3}{4_{1}}-12^{4}\cdot\frac{5\cdot(x+1)}{3_{1}}=12^{6}\cdot\frac{3\cdot(x-2)}{2_{1}}-12^{4}\cdot\frac{4\cdot(x+1)}{3_{1}}$$

$$48x-3x-9-20x-20=18x-36-16x-16$$

$$48x-3x-20x-18x+16x=-36-16+9+20$$

$$45x-20x-2x=-52+29$$

$$23x=-23$$

$$x=-\frac{23}{23}=-1$$

Verifica

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

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

$$-4-\frac{2^{1}}{4_{2}}=\frac{3\cdot(-3)}{2}$$

$$\frac{-8-1}{2}=-\frac{9}{2}$$

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

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

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$12\cdot\frac{x+1}{2}-12\cdot\frac{3-x}{4}=12\cdot 2-12\cdot\frac{1}{3}(6-x)$$

$$6x+6-9+3x=24-4(6-2x)$$

$$9x-3=24-24+8x$$

$$9x-8x=3$$

$$x=3$$

Verifica

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

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

$$\frac{4}{2}=2$$

$$2=2$$

verificata

$$\frac{3\cdot(2x+1)}{5}-\frac{3\cdot(1+x)}{15}=2+\frac{15x-2}{20}$$

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$60\frac{3(2x+1)}{5}-60\frac{3(1+x)}{15}=60\cdot 2+60\frac{15x-2}{20}$$
$$12\frac{3(2x+1)}{1}-4\frac{3(1+x)}{1}=120+3\frac{15x-2}{1}$$
$$36(2x+1)-12(1+x)=120+3(15x-2)$$
$$72x+36-12-12x=120+45x-6$$
$$72x-12x-45x=120-6-36+12$$
$$60x-45x=120-30$$
$$15x=90$$
$$x=90/15=6$$

$$\frac{3\cdot(2x+1)}{5}-\frac{3\cdot(1+x)}{15}=2+\frac{15x-2}{20}$$
$$\frac{3\cdot(2\cdot 6+1)}{5}-\frac{3\cdot(1+6)}{15}=2+\frac{15\cdot 6-2}{20}$$
$$\frac{3\cdot(13)}{5}-\frac{3\cdot(7)}{15}=2+\frac{90-2}{20}$$
$$\frac{39}{5}-\frac{21}{15}=2+\frac{88}{20}$$
$$\frac{117-21}{15}=\frac{40+88}{20}$$
$$\frac{96}{15}=\frac{128}{20}$$
$$\frac{32}{5}=\frac{32}{5}$$

Oppure

$$\frac{6x+3}{5}-\frac{3+3x}{15}=2+\frac{15}{20}x-\frac{2}{20}$$
$$\frac{6}{5}x+\frac{3}{5}-\frac{3}{15}-\frac{3}{15}x=2+\frac{15}{20}x-\frac{2}{20}$$
$$\frac{6}{5}x-\frac{3}{15}x-\frac{15}{20}x=2-\frac{2}{20}-\frac{3}{5}+\frac{3}{15}$$
$$\frac{6}{5}x-\frac{1}{5}x-\frac{3}{4}x=2-\frac{1}{10}-\frac{3}{5}+\frac{1}{5}$$
$$\frac{24-4-15}{20}x=\frac{20-1-6+2}{10}$$
$$\frac{5}{20}x=\frac{15}{10}$$
$$x=\frac{15}{10}\frac{20}{5}=\frac{3\cdot 2}{1}=6$$

$$3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)-(x-2)-\frac{1}{4}=-\frac{2x+1}{4}$$

Applico una delle conseguenze del 2^ principio per la riduzione a coefficienti interi

$$4\cdot 3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)-4\cdot(x-2)-4\cdot\frac{1}{4}=4\cdot\left(-\frac{2x+1}{4}\right)$$

$$12\cdot\left(\frac{5}{2}-\frac{1}{4}x-\frac{16}{4}\right)-4\cdot(x-2)-1=4\cdot\left(-\frac{2}{4}x-\frac{1}{4}\right)$$

$$30-3x-48-4x+8-1=-2x-1$$

$$-3x-4x+2x=-1-30+48-8+1$$

$$-5x=10$$

$$x=-2$$

Verifica

$$3\cdot\left(\frac{5}{2}-\frac{-2+16}{4}\right)-(-2-2)-\frac{1}{4}=-\frac{-4+1}{4}$$

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

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

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

Per disegnare la retta corrispondente

$$3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)-(x-2)-\frac{1}{4}=-\frac{2x+1}{4}$$

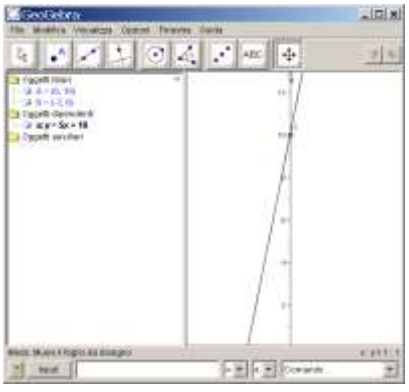
$$30-3x-48-4x+8-1=-2x-1$$

$$-3x-4x+2x=-1-30+48-8+1$$

$$0=3x+4x-2x-1-30+48-8+1$$

$$0=5x+10$$

$$y=5x+10$$



$$\frac{2x+1}{4}-(x-2)=-3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)+\frac{1}{4}$$

$$4\cdot\frac{2x+1}{4}-4\cdot(x-2)=4\cdot(-3)\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)+4\cdot\frac{1}{4}$$

$$4\cdot\left(\frac{2}{4}x+\frac{1}{4}\right)-4\cdot(x-2)=-12\cdot\left(\frac{5}{2}-\frac{1}{4}x-\frac{16}{4}\right)+1$$

$$2x+1-4x+8=-30+3x+48+1$$

$$2x-4x-3x=-30+48+1-1-8$$

$$-5x=10$$

$$x=-2$$

Verifica

$$\frac{-4+1}{4}-(-2-2)=-3\cdot\left(\frac{5}{2}-\frac{-2+16}{4}\right)+\frac{1}{4}$$

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

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

$$\frac{13}{4}=\frac{13}{4}$$

Per disegnare la retta corrispondente

$$\frac{2x+1}{4}-(x-2)=-3\cdot\left(\frac{5}{2}-\frac{x+16}{4}\right)+\frac{1}{4}$$

$$2x+1-4x+8=-30+3x+48+1$$

$$2x-4x-3x=-30+48+1-1-8$$

$$0=-2x+4x+3x-30+48+1-1-8$$

$$0=5x+10$$

$$y=5x+10$$

$$\frac{3\cdot(2x-1)}{4}-\frac{5\cdot(3x-5)}{3}=\frac{7-4x}{12}+\frac{2}{3}$$

$$12\cdot\frac{3\cdot(2x-1)}{4}-12\cdot\frac{5\cdot(3x-5)}{3}=12\cdot\frac{7-4x}{12}+12\cdot\frac{2}{3}$$

$$3\cdot 3\cdot(2x-1)-4\cdot 5\cdot(3x-5)=7-4x+4\cdot 2$$

$$9\cdot(2x-1)-20\cdot(3x-5)=7-4x+8$$

$$18x-9-60x+100=7-4x+8$$

$$18x-60x+4x=7+8+9-100$$

$$-38x=-76$$

$$38x=76$$

$$x=76/38=2$$

Verifica

$$\frac{3\cdot(2\cdot 2-1)}{4}-\frac{5\cdot(3\cdot 2-5)}{3}=\frac{7-4\cdot 2}{12}+\frac{2}{3}$$

$$\frac{3\cdot(4-1)}{4}-\frac{5\cdot(6-5)}{3}=\frac{7-8}{12}+\frac{2}{3}$$

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

$$\frac{9}{4}-\frac{5}{3}=\frac{-1+8}{12}$$

$$\frac{27-20}{12}=\frac{7}{12}$$

$$\frac{7}{12}=\frac{7}{12}$$

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

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

$$2x-1-3x+1=3x-12$$

$$2x-3x-3x=-12$$

$$-4x=-12$$

$$4x=12$$

$$x=3$$

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

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

$$\frac{5}{6}-\frac{8}{6}=-\frac{1}{2}$$

$$-\frac{3^{1}}{6_{2}}=-\frac{1}{2}$$

$$\frac{x+3}{2}-\frac{1}{2}=\frac{2(2x+3)}{5}-\frac{3x-1}{4}$$

$$20\cdot\frac{x+3}{2}-20\cdot\frac{1}{2}=20\cdot\frac{2(2x+3)}{5}-20\cdot\frac{3x-1}{4}$$

$$10x+30-10=16x+24-15x+5$$

$$10x+20=x+29$$

$$10x-x=29-20$$

$$9x=9$$

$$x=1$$

$$\frac{x+3}{2}-\frac{1}{2}=\frac{2(2x+3)}{5}-\frac{3x-1}{4}$$

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

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

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

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

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

$$\frac{2x+3}{2}-\frac{3(x+2)}{4}=\frac{1}{3}-\frac{2-x}{3}$$
$$\frac{6(2x+3)-9(x+2)}{12}=\frac{4-4(2-x)}{12}$$
$$12x+18-9x-18=4-8+4x$$
$$12x-9x-4x=4-8$$
$$-x=-4$$
$$x=4$$

$$\frac{2\cdot 4+3}{2}-\frac{3(4+2)}{4}=\frac{1}{3}-\frac{2-4}{3}$$
$$\frac{8+3}{2}-\frac{3\cdot 6}{4}=\frac{1}{3}-\frac{-2}{3}$$
$$\frac{11}{2}-\frac{18}{4}=\frac{1}{3}+\frac{2}{3}$$
$$\frac{11}{2}-\frac{9}{2}=\frac{3}{3}$$
$$\frac{2}{2}=1$$
$$1=1$$

$$\frac{2(x+3)}{15}=\frac{2x+1}{3}-\frac{x-2}{5}$$
$$\frac{2(x+3)}{15}=\frac{5(2x+1)-3(x-2)}{15}$$
$$2x+6=10x+5-3x+6$$
$$2x-10x+3x=5+6-6$$
$$-5x=5$$
$$x=\frac{5}{-5}=-1$$

Verifica

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

$$\frac{x-7}{3}-\frac{2x-1}{15}-\frac{8}{15}=\frac{3x-1}{10}-\frac{x-1}{2}$$
$$\frac{10(x-7)-2(2x-1)-16}{30}=\frac{3(3x-1)-15(x-1)}{30}$$
$$10x-70-4x+2-16=9x-3-15x+15$$
$$10x-4x-9x+15x=-3+15+70-2+16$$
$$12x=96$$
$$x=\frac{96}{12}=8$$

$$\frac{8-7}{3}-\frac{16-1}{15}-\frac{8}{15}=\frac{24-1}{10}-\frac{8-1}{2}$$
$$\frac{1}{3}-\frac{15}{15}-\frac{8}{15}=\frac{23}{10}-\frac{7}{2}$$
$$\frac{5-15-8}{15}=\frac{23-35}{10}$$
$$-\frac{18}{15}=-\frac{12}{10}$$
$$-\frac{6}{5}=-\frac{6}{5}$$

$$\frac{13x-2}{12}+\frac{2-3x}{10}-\frac{x+1}{5}=1$$
$$\frac{5(13x-2)+6(2-3x)-12(x+1)}{60}=\frac{60}{60}$$
$$65x-10+12-18x-12x-12=60$$
$$65x-18x-12x=60+10$$
$$35x=70$$
$$x=\frac{70}{35}=2$$

Verifica

$$\frac{13\cdot 2-2}{12}+\frac{2-3\cdot 2}{10}-\frac{2+1}{5}=1$$
$$\frac{26-2}{12}+\frac{2-6}{10}-\frac{3}{5}=1$$
$$\frac{24}{12}-\frac{4}{10}-\frac{3}{5}=1$$
$$2-\frac{2}{5}-\frac{3}{5}=1$$
$$2-1=1$$
$$1=1$$

$$\frac{3x-9}{2}+3x-3=\frac{x+1}{4}+x+2$$

$$6x-18+12x-12=x+1+4x+8$$

$$6x+12x-x-4x=1+8+18+12$$

$$13x=39$$

$$x=\frac{39}{13}=3$$

$$\frac{3\cdot 3-9}{2}+3\cdot 3-3=\frac{3+1}{4}+3+2$$

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

$$0+9-3=1+3+2$$

$$6=6$$

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

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

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

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

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

$$12x=4$$

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

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

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

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

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

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

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

$$\frac{x-2}{5}-\frac{2x+1}{3}+\frac{2x+6}{15}=0$$
$$\frac{x}{5}-\frac{2}{5}-\frac{2x}{3}-\frac{1}{3}+\frac{2x}{15}+\frac{6}{15}=0$$
$$\frac{x}{5}-\frac{2x}{3}+\frac{2x}{15}=+\frac{2}{5}+\frac{1}{3}-\frac{6}{15}$$
$$\frac{3x-10x+2x}{15}\cdot 15=\frac{6+5-6}{15}\cdot 15$$
$$3x-10x+2x=6+5-6$$
$$-5x=5$$
$$5x=-5$$
$$x=\frac{-5}{5}=-1$$

$$\frac{(-1)-2}{5}-\frac{2\cdot(-1)+1}{3}+\frac{2\cdot(-1)+6}{15}=0$$
$$-\frac{3}{5}-\frac{-1}{3}+\frac{4}{15}=0$$
$$-\frac{3}{5}+\frac{1}{3}+\frac{4}{15}=0$$
$$\frac{-9+5+4}{5}=0$$
$$\frac{0}{15}=0$$
$$0=0$$

2° modo

$$\frac{3(x-2)-5(2x+1)+2x+6}{15}=0$$
$$3x-6-10x-5+2x+6=0$$
$$3x-10x+2x=5$$
$$-5x=5$$
$$5x=-5$$
$$x=\frac{-5}{5}=-1$$

$$\frac{2(x+2)}{3}-\frac{3x-1}{2}=1+\frac{2(x-1)}{3}$$
$$\frac{4(x+2)-3(3x-1)}{6}=\frac{6+4(x-1)}{6}$$
$$4x+8+3=6+4x-4$$
$$4x+11=2+4x$$
$$-9x=2-11$$
$$-9x=-9$$
$$9x=9$$
$$x=1$$

$$\frac{2\left(\frac{1}{3}+2\right)}{3}-\frac{3\cdot\frac{1}{3}-1}{2}=1+\frac{2\left(\frac{1}{3}-1\right)}{3}$$
$$\frac{2\cdot\frac{7}{3}}{3}-\frac{1-1}{2}=1+\frac{2\cdot\left(-\frac{2}{3}\right)}{3}$$
$$\frac{2\cdot\frac{7}{3}}{3}-\frac{1-1}{2}=1+\frac{-\frac{4}{3}}{3}$$
$$\frac{14}{3}\cdot\frac{1}{3}=1+\left(-\frac{4}{3}\right)\cdot\frac{1}{3}$$
$$\frac{14}{9}=1-\frac{4}{9}$$

$$\frac{2(x-5)}{3}-\frac{2x+3}{5}=\frac{1}{3}x+\frac{2(-x-25)}{15}$$
$$\frac{10(x-5)-3(2x+3)}{15}=\frac{5x+2(-x-25)}{15}$$
$$10x-50-6x-9=5x-2x-50$$
$$4x-9=3x$$
$$4x-3x=9$$
$$x=9$$

$$\frac{2\cdot(9-5)}{3}-\frac{2\cdot9+3}{5}=\frac{1}{3}\cdot9+\frac{2\cdot(-9-25)}{15}$$
$$\frac{2\cdot4}{3}-\frac{18+3}{5}=3+\frac{2\cdot(-34)}{15}$$
$$\frac{8}{3}-\frac{21}{5}=3-\frac{68}{15}$$
$$\frac{40-63}{15}=\frac{45-68}{15}$$
$$-\frac{23}{15}=-\frac{23}{15}$$

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

$$\frac{24+2(1-x)}{6}=\frac{6x-3(x+3)}{6}$$

$$24+2-2x=6x-3x-9$$

$$26-2x=3x-9$$

$$-2x-3x=-9-26$$

$$-5x=-35$$

$$5x=35$$

$$x=\frac{35}{5}=7$$

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

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

$$4-2=7-5$$

$$2=2$$

$$\frac{9-x}{2}+\frac{1}{20}x=\frac{29}{20}-\frac{x-5}{2}+\frac{x-1}{5}$$

$$\frac{10(9-x)+x}{20}=\frac{29-10(x-5)+4(x-1)}{20}$$

$$90-10x+x=29-10x+50+4x-4$$

$$90+x=29+50+4x-4$$

$$x-4x=79-4-90$$

$$-3x=-15$$

$$3x=15$$

$$x=\frac{15}{3}=5$$

$$\frac{9-5}{2}+\frac{1}{20}\cdot 5=\frac{29}{20}-\frac{5-5}{2}+\frac{5-1}{5}$$

$$\frac{4}{2}+\frac{1}{4}=\frac{29}{20}+\frac{4}{5}$$

$$2+\frac{1}{4}=\frac{29+16}{20}$$

$$\frac{9}{4}=\frac{45}{20}$$

$$\frac{9}{4}=\frac{9}{4}$$

$$\frac{x+6}{2}+\frac{7}{6}x=\frac{2x+3}{3}-3$$
$$\frac{3(x+6)+7x}{6}=\frac{2(2x+3)-6\cdot 3}{6}$$
$$3x+18+7x=4x+6-18$$
$$3x+7x-4x=6-18-18$$
$$6x=-30$$
$$x=-\frac{30}{6}=-5$$

$$\frac{-5+6}{2}+\frac{7}{6}\cdot(-5)=\frac{2\cdot(-5)+3}{3}-3$$
$$\frac{1}{2}-\frac{35}{6}=-\frac{7}{3}-3$$
$$\frac{3-35}{6}=\frac{-7-9}{3}$$
$$-\frac{32}{6}=-\frac{16}{3}$$
$$-\frac{16}{3}=-\frac{16}{3}$$

$$x+\frac{x+2}{4}+\frac{1}{3}x=3+\frac{1}{3}x$$
$$x+\frac{x+2}{4}=3$$
$$\frac{4x+x+2}{4}=\frac{4\cdot 3}{4}$$
$$4x+x+2=12$$
$$5x=12-2$$
$$5x=10$$
$$x=\frac{10}{5}=2$$

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

$$-\frac{x+6}{2}+\frac{1}{3}x=-\frac{2x+3}{3}+\frac{1}{2}$$
$$\frac{-3(x+6)+2x}{6}=\frac{-2(2x+3)+3}{6}$$
$$-3x-18+2x=-4x-6+3$$
$$-3x+2x+4x=-3+18$$
$$3x=+15$$
$$x=5$$

$$-\frac{5+6}{2}+\frac{1}{3}\cdot(5)=-\frac{2\cdot(5)+3}{3}+\frac{1}{2}$$
$$-\frac{11}{2}+\frac{5}{3}=-\frac{13}{3}+\frac{1}{2}$$
$$\frac{-33+10}{6}=\frac{-26+3}{6}$$
$$-\frac{23}{6}=-\frac{23}{6}$$

$$\frac{1}{2}x-\frac{2(x+6)}{3}=-\frac{1}{3}-\frac{2x+3}{2}+x$$
$$\frac{3x-4(x+6)}{6}=\frac{-2-3(2x+3)+6x}{6}$$
$$3x-4x-24=-2-6x-9+6x$$
$$3x-4x=-2-9+24$$
$$-x=+13$$
$$x=-13$$

$$-\frac{13}{2}-\frac{2(-7)}{3}=-\frac{1}{3}-\frac{-26+3}{2}-13$$
$$-\frac{13}{2}+\frac{14}{3}=-\frac{1}{3}+\frac{23}{2}-13$$
$$\frac{-39+28}{6}=\frac{-2+69-78}{6}$$
$$-\frac{11}{6}=-\frac{11}{6}$$

$$\frac{2x-3}{4}+\frac{2x+3}{3}=1+\frac{5}{12}x$$
$$\frac{3(2x-3)+4(2x+3)}{12}=\frac{12+5x}{12}$$
$$6x-9+8x+12=12+5x$$
$$6x+8x-5x=9$$
$$9x=9$$
$$x=1$$

$$\frac{2-3}{4}+\frac{2+3}{3}=1+\frac{5}{12}$$
$$-\frac{1}{4}+\frac{5}{3}=\frac{12+5}{12}$$
$$\frac{-3+20}{12}=\frac{17}{12}$$
$$\frac{17}{12}=\frac{17}{12}$$

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

$$18\cdot(x-2)-16\cdot(x+1)=12\cdot 4x-3\cdot(x+3)-20\cdot(x+1)$$

$$18x-36-16x-16=48x-3x-9-20x-20$$

$$18x-16x-48x+3x+20x=-9-20+36+16$$

$$2x-48x+3x+20x=-29+36+16$$

$$-46x+3x+20x=7+16$$

$$-43x+20x=23$$

$$-23x=23$$

$$23x=-23$$

$$x=-\frac{23}{23}$$

$$x=-1$$

Verifica

$$\frac{3\cdot(-3)}{2}-\frac{4\cdot 0}{3}=-4-\frac{2}{4}-\frac{5\cdot 0}{3}$$

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

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

$$\frac{x+2}{6}=\frac{x+2}{3}-\frac{4x+5}{6}-\frac{1-x}{2}-x$$

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

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

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

$$6x=-6$$

$$x=-1$$

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: مُعادَلَه
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: ecuaţie
Russian: формула реакции
Slovak: rovnica
Slovenian: enačba
Swedish: kemisk formel
Turkish: denklem