Solucions Equacions de Primer Grau

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

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

   5·(x + 1) = 2·(2x − 3)

   5x + 5 = 4x − 6

   5x − 4x = -6 − 5

   $\boxed{x=-11}$

2. $\dfrac{3x-2}{6}=\dfrac{5x+1}{2}$

   $6\cdot\dfrac{3x-2}{6}=6\cdot\dfrac{5x+1}{2}$

   1·(3x − 2) = 3·(5x + 1)

   3x − 2 = 15x + 3

   3x − 15x = 3 + 2

   -12x = 5

   $\boxed{x=\dfrac{5}{-12}}$

3. $2+\dfrac{7x-1}{3}=\dfrac{2-5x}{4}-10$

   $12\cdot2+12\cdot\dfrac{7x-1}{3}=12\cdot\dfrac{2-5x}{4}-12\cdot10$

   24 + 4·(7x − 1) = 3·(2 − 5x) − 120

   24 + 28x − 4 = 6 − 15x − 120

   28x + 15x = 6 − 120 − 24 + 4

   43x = -134

   $\boxed{x=\dfrac{-134}{43}}$

4. $3-\dfrac{2x-5}{2}=1+\dfrac{x+2}{10}$

   $10\cdot3-10\cdot\dfrac{2x-5}{2}=10\cdot1+10\cdot\dfrac{x+2}{10}$

   30 − 5·(2x − 5) = 10 + 1·(x + 2)

   30 − 10x + 25 = 10 + x + 2

   -10x − x = 10 + 2 − 30 − 25

   -11x = -43

   $x=\dfrac{-43}{-11}$

   $\boxed{x=\dfrac{43}{11}}$

5. $\dfrac{x-1}{2}-\dfrac{x-2}{3}+\dfrac{x-3}{4}=8$

   $12\cdot\dfrac{x-1}{2}-12\cdot\dfrac{x-2}{3}+12\cdot\dfrac{x-3}{4}=12\cdot8$

   6·(x − 1) − 4·(x − 2) + 3·(x − 3) = 96

   6x − 6 − 4x + 8 + 3x − 9 = 96

   6x − 4x + 3x = 96 + 6 − 8 + 9

   5x =103

$$x = \frac{103}{5}$$

6. $6 + \dfrac{5 \cdot (x - 3)}{4} = 1 - \dfrac{2 \cdot (2x - 5)}{6}$

$6 + \dfrac{5x - 15}{4} = 1 - \dfrac{4x - 10}{6}$

$12 \cdot 6 + 12 \cdot \dfrac{5x - 15}{4} = 12 \cdot 1 - 12 \cdot \dfrac{4x - 10}{6}$

$72 + 3 \cdot (5x - 15) = 12 - 2 \cdot (4x - 10)$

$72 + 15x - 45 = 12 - 8x + 20$

$15x + 8x = 12 + 20 - 72 + 45$

$23x = 5$

$$x = \frac{5}{23}$$

7. $\dfrac{2x + 1}{3} - 4 \cdot \dfrac{5 - x}{7} + 1 = -2 + \dfrac{2 \cdot (7 + 2x)}{21}$

$\dfrac{2x + 1}{3} - \dfrac{20 - 4x}{7} + 1 = -2 + \dfrac{14 + 4x}{21}$

$21 \cdot \dfrac{2x + 1}{3} - 21 \cdot \dfrac{20 - 4x}{7} + 21 \cdot 1 = 21 \cdot (-2) + 21 \cdot \dfrac{14 + 4x}{21}$

$7 \cdot (2x + 1) - 3 \cdot (20 - 4x) + 21 = -42 + 1 \cdot (14 + 4x)$

$14x + 7 - 60 + 12x + 21 = -42 + 14 + 4x$

$14x + 12x - 4x = -42 + 14 - 7 + 60 - 21$

$22x = 4$

$x = \dfrac{4}{22}$

$$x = \frac{2}{11}$$

8. $1 - \dfrac{2(x + 3)}{3} + \dfrac{3 \cdot (x - 4)}{4} - \dfrac{4 \cdot (x + 5)}{5} = 0$

$1 - \dfrac{2x + 6}{3} + \dfrac{3x - 12}{4} - \dfrac{4x + 20}{5} = 0$

$60 \cdot 1 - 60 \cdot \dfrac{2x + 6}{3} + 60 \cdot \dfrac{3x - 12}{4} - 60 \cdot \dfrac{4x + 20}{5} = 0$

$60 - 20 \cdot (2x + 6) + 15 \cdot (3x - 12) - 12 \cdot (4x + 20) = 0$

$60 - 40x - 120 + 45x - 180 - 48x - 240 = 0$

$-40x + 45x - 48x = -60 + 120 + 180 + 240$

$-43x = 480$

$$x = \frac{480}{-43}$$

9. $\dfrac{x + 1}{4} = \dfrac{4x - 3}{5}$

$20 \cdot \dfrac{x + 1}{4} = 20 \cdot \dfrac{4x - 3}{5}$

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

$5x + 5 = 16x - 12$

$5x - 16x = -12 - 5$

$-11x = -17$

$x = \dfrac{-17}{-11}$

$$x = \frac{17}{11}$$

10. $\dfrac{6x-2}{6} = \dfrac{5x+1}{4}$

$12 \cdot \dfrac{6x-2}{6} = 12 \cdot \dfrac{5x+1}{4}$

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

$12x - 4 = 15x + 3$

$12x - 15x = 3 + 4$

$-3x = 7$

$$x = \frac{7}{-3}$$

11. $\dfrac{2x+1}{5} = \dfrac{x-4}{3}$

m.c.m (5, 3) = 15

$15 \cdot \dfrac{2x+1}{5} = 15 \cdot \dfrac{x-4}{3}$

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

$6x + 3 = 5x - 20$

$6x - 5x = -20 - 3$

$$x = -23$$

12. $\dfrac{x-2}{2} = \dfrac{7-3x}{4}$

m.c.m (2, 4) = 4

$4 \cdot \dfrac{x-2}{2} = 4 \cdot \dfrac{7-3x}{4}$

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

$2x - 4 = 7 - 3x$

$2x + 3x = 7 + 4$

$5x = 11$

$$x = \frac{11}{5}$$

13. $3 + \dfrac{2-x}{5} = \dfrac{3x+1}{2} - 6$

m.c.m (5, 2) = 10

$10 \cdot 3 + 10 \cdot \dfrac{2-x}{5} = 10 \cdot \dfrac{3x+1}{2} - 10 \cdot 6$

$30 + 2 \cdot (2 - x) = 5 \cdot (3x + 1) - 60$

$30 + 4 - 2x = 15x + 5 - 60$

$-2x - 15x = 5 - 60 - 30 - 4$

$-17x = -89$

$x = \dfrac{-89}{-17}$

$$x = \frac{89}{17}$$

14. $2x + \dfrac{1+3x}{3} = 5 - \dfrac{x-7}{2}$

m.c.m (3, 2) = 6

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

$12x + 2 \cdot (1 + 3x) = 30 - 3 \cdot (x - 7)$

$12x + 2 + 6x = 30 - 3x + 21$

$12x + 6x + 3x = 30 + 21 - 2$

$21x = 49$

$$x = \frac{49}{21}$$

$$\boxed{x = \frac{7}{3}}$$

15. $x - \dfrac{x+2}{6} = \dfrac{5x-1}{3} - \dfrac{3x+1}{2}$

m.c.m (6, 3, 2) = 6

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

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

$6x - x - 2 = 10x - 2 - 9x - 3$

$6x - x - 10x + 9x = -2 - 3 + 2$

$4x = -3$

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

16. $\dfrac{5-x}{4} - \dfrac{2x+1}{6} = 1 - \dfrac{x-2}{3}$

m.c.m (4, 6, 3) = 12

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

$3 \cdot (5 - x) - 2 \cdot (2x + 1) = 12 - 4 \cdot (x - 2)$

$15 - 3x - 4x - 2 = 12 - 4x + 8$

$-3x - 4x + 4x = 12 + 8 - 15 + 2$

$-3x = 7$

$$\boxed{x = \frac{7}{-3}}$$

17. $\dfrac{3+2x}{15} - \dfrac{x-4}{3} = \dfrac{2-x}{5} - \dfrac{2x+4}{3}$

m.c.m (15, 3, 5) = 15

$$15 \cdot \frac{3+2x}{15} - 15 \cdot \frac{x-4}{3} = 15 \cdot \frac{2-x}{5} - 15 \cdot \frac{2x+4}{3}$$

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

$3 + 2x - 5x + 20 = 6 - 3x - 10x - 20$

$2x - 5x + 3x + 10x = 6 - 20 - 3 - 20$

$10x = -37$

$$\boxed{x = \frac{-37}{10}}$$

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

$$5 + \frac{2x-8}{3} - \frac{10x-5}{6} + \frac{15-3x}{2} = \frac{3x+2}{6}$$

m.c.m (3, 6, 2) = 6

$$6 \cdot 5 + 6 \cdot \frac{2x-8}{3} - 6 \cdot \frac{10x-5}{6} + 6 \cdot \frac{15-3x}{2} = 6 \cdot \frac{3x+2}{6}$$

$30 + 2·(2x − 8) − 1·(10x − 5) + 3·(15 − 3x) = 1·(3x + 2)$

$30 + 4x − 16 − 10x + 5 + 45 − 9x = 3x + 2$

$4x − 10x − 9x − 3x = 2 − 30 + 16 − 5 − 45$

$-18x = -62$

$x = \dfrac{-62}{-18}$

$\boxed{x = \dfrac{31}{9}}$

19. $\dfrac{3\,(2 − x)}{10} − \dfrac{2x − 5}{4} = 6 − \dfrac{2\,(1 − 3x)}{5}$

$\dfrac{6 − 3x}{10} − \dfrac{2x − 5}{4} = 6 − \dfrac{2 − 6x}{5}$

m.c.m $(10, 4, 5) = 20$

$20 \cdot \dfrac{6 − 3x}{10} − 20 \cdot \dfrac{2x − 5}{4} = 20 \cdot 6 − 20 \cdot \dfrac{2 − 6x}{5}$

$2·(6 − 3x) − 5·(2x − 5) = 120 − 4·(2 − 6x)$

$12 − 6x − 10x + 25 = 120 − 8 + 24x$

$-6x − 10x − 24x = 120 − 8 − 12 − 25$

$-40x = 75$

$x = \dfrac{75}{-40}$

$\boxed{x = -\dfrac{15}{8}}$

20. $7 \cdot \dfrac{x − 2}{4} − 5 \cdot \dfrac{1 − 2x}{3} = \dfrac{5\,(x + 2)}{6}$

$\dfrac{7 \cdot (x − 2)}{4} − \dfrac{5 \cdot (1 − 2x)}{3} = \dfrac{5 \cdot (x + 2)}{6}$

$\dfrac{7x − 14}{4} − \dfrac{5 − 10x}{3} = \dfrac{5x + 10}{6}$

m.c.m $(4, 3, 6) = 12$

$12 \cdot \dfrac{7x − 14}{4} − 12 \cdot \dfrac{5 − 10x}{3} = 12 \cdot \dfrac{5x + 10}{6}$

$3·(7x − 14) − 4·(5 − 10x) = 2·(5x + 10)$

$21x − 42 − 20 + 40x = 10x + 20$

$21x + 40x − 10x = 20 + 42 + 20$

$51x = 82$

$\boxed{x = \dfrac{82}{51}}$

21. $\dfrac{3x − 1}{7} = \dfrac{x + 5}{2}$

m.c.m $(7, 2) = 14$

$14 \cdot \dfrac{3x − 1}{7} = 14 \cdot \dfrac{x + 5}{2}$

$2·(3x − 1) = 7·(x + 5)$

$6x − 2 = 7x + 35$

$6x − 7x = 35 + 2$

$-x = 37$

$\boxed{x = -37}$

22. $\dfrac{x − 2}{3} = \dfrac{7x − 1}{15}$

m.c.m $(3, 15) = 15$

$$15 \cdot \frac{x-2}{3} = 15 \cdot \frac{7x-1}{15}$$

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

$5x - 10 = 7x - 1$

$5x - 7x = -1 + 10$

$-2x = 9$

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

23. $-5 + \dfrac{1-3x}{2} = \dfrac{3x+9}{6} + 7$

m.c.m $(2, 6) = 6$

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

$-30 + 3 \cdot (1 - 3x) = 1 \cdot (3x + 9) + 42$

$-30 + 3 - 9x = 3x + 9 + 42$

$-9x - 3x = 9 + 42 + 30 - 3$

$-12x = 78$

$$x = \frac{78}{-12}$$

$$\boxed{x = -\frac{13}{2}}$$

24. $11 + \dfrac{3x-5}{9} = 1 + \dfrac{2x+9}{15}$

m.c.m $(9, 15) = 45$

$$45 \cdot 11 + 45 \cdot \frac{3x-5}{9} = 45 \cdot 1 + 45 \cdot \frac{2x+9}{15}$$

$495 + 5 \cdot (3x - 5) = 45 + 3 \cdot (2x + 9)$

$495 + 15x - 25 = 45 + 6x + 27$

$15x - 6x = 45 + 27 - 495 + 25$

$9x = -398$

$$\boxed{x = \frac{-398}{9}}$$

25. $\dfrac{x+1}{2} - \dfrac{x+2}{3} - \dfrac{x+3}{4} = 8$

m.c.m $(2, 3, 4) = 12$

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

$6 \cdot (x + 1) - 4 \cdot (x + 2) - 3 \cdot (x + 3) = 96$

$6x + 6 - 4x - 8 - 3x - 9 = 96$

$6x - 4x - 3x = 96 - 6 + 8 + 9$

$-x = 107$

$$\boxed{x = -107}$$