

7-10 Determine si el valor dado es una solución de la ecuación.

$$7. \quad 4x + 7 = 9x - 3$$

$$a) x = -2$$

$$b) x = 2$$

$$4x + 7 = 9x - 3$$

$$\cancel{4x + 7} - \cancel{7} = 9x - 3 - 7$$

$$4x = 9x - 10$$

$$4x + 10 = 9x - 10 + 10$$

$$4x + 10 = 9x$$

$$\cancel{4x} - \cancel{4x} + 10 = 9x + 4x$$

$$10 = 5x$$

$$x = \frac{10}{5} = \frac{2}{1}$$

$$x = 2$$

$$L.H.S: \quad 4x + 7$$

$$4(2) + 7$$

$$8 + 7$$

$$15$$

$$R.H.S: \quad 9x - 3$$

$$9(2) - 3$$

$$18 - 3$$

$$15$$

$$8. 7-[2-(3-x)] = 4x - (6+x)$$

$$\boxed{a \ x=2}$$

$$b \ x=4$$

$$7-[2-(3-x)] = 4x - (6+x)$$

$$7-[2-3+x] = 4x-6-x$$

$$7-2+3-x = 3x-6$$

$$2-x = 3x-6$$

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

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

$$-4x = -6-2$$

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

$$x = 2$$

$$9. \frac{1}{x} - \frac{1}{x-4} = 1$$

$$\boxed{a \ x=2}$$

$$b \ x=4$$

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

$$\cancel{\frac{1}{x}} + \cancel{\frac{1}{x}} - \frac{1}{x-4} = 1 - \cancel{\frac{1}{x}}$$

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

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

$$x = x - 4$$

$$4 = x + x$$

$$4 = 2x$$

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

$$P = C - NC - ST$$

$$x = 2$$

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

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

$$\frac{1}{2} - \frac{1}{-2} = 1 \Rightarrow \frac{1 - (-1)}{2} = 1$$

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

$$10. \frac{x^{3/2}}{x-6} = x-8$$

$$\boxed{a \quad x=4}$$

$$b \quad x=8$$

$$\frac{x^{3/2}}{x-6} = x-8$$

$$\Rightarrow \frac{4^{3/2}}{4-6} = 4-8 \Rightarrow \frac{4^{3/2}}{-2} = -4$$

$$\Rightarrow 4^{3/2} = (-2) \cdot (-4) \Rightarrow 4^{3/2} = 8$$

$$4\sqrt[3]{8^2} = 4 = \sqrt[3]{64} = 4 = 4$$

$$\frac{8}{8-6} = 8-8 \Rightarrow \frac{8}{2}^{3/2} = 0 \Rightarrow 8^{3/2} = 0$$

$$12 \quad 5x-3=4$$

$$5x-3-4=4-4$$

$$5x=7=0$$

$$5x-7+7=7$$

$$5x=7$$

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

$$15. -7w = 15 - 2w$$

$$-7w + 2w = 15 - 2w + 2w$$

$$-5w = 15$$

$$\frac{1}{5} \cdot 5w = \frac{1}{5} \cdot 15$$

$$-w = 3 \Rightarrow -3 = w$$

$$\boxed{w = -3}$$

$$19. 2(7-x) = 3(1+2x)+5$$

$$2(\cancel{7}-\cancel{x}) = 3(\cancel{1}+\cancel{2x})+5$$

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

$$2-\cancel{2x}+\cancel{2x} = 12+6x+5+\cancel{2x}$$

$$2 = 6x+2x+12+5$$

$$2 = 8x+17$$

$$-17+2 = 8x+17-\cancel{17}$$

$$-15 = 8x$$

$$8x = -15$$

$$x = \frac{-15}{8}$$

$$\boxed{x = -1.875}$$

29. $PV = nRT$; despejar R .

$$\frac{PV}{nT} = R$$

30 $F = 6 \frac{mM}{r^2}$ despeje m .

$$\frac{r^2}{mM} F = 6 \frac{mM}{r^2} \left(\frac{r^2}{mM} \right)$$

$$\frac{Fr^2}{6M} = m$$

31. $p = 21 + 2w$; despeje w .

$$\frac{p - 21}{2} = w$$

$$32. \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \quad \text{despeje } R$$

$$\frac{1}{R} - \frac{1}{R_2} = \frac{1}{R_1} + \cancel{\frac{1}{R_2}} - \cancel{\frac{1}{R_2}}$$

$$\frac{1}{R} - \frac{1}{R_2} = \frac{1}{R_1}$$

$$R_1 = \frac{1}{\frac{1}{R} - \frac{1}{R_2}} \rightarrow R_1 = R - \frac{2}{R}$$

$$33. \frac{ax+b}{cx+d} = 2 \quad \text{despeje } x$$

$$(cx+d) \cdot \frac{ax+b}{cx+d} = 2(cx+d)$$

$$ax+b = 2cx+d$$

$$ax - 2cx = d - b$$

$$x = \frac{a-b}{d-2c}$$

34. $a - 2[6 - 3c + 3x] = 6$; despeje x .

$$a - 2[6 - 3c + 3x] = 6$$

$$a - 2b + 6c - 6x = 6$$

$$6c - 2b - 6 = 6x$$

$$\frac{6c}{6} - \frac{2b}{6} - \frac{6}{6} = x$$

$$x = c - \frac{1}{3}b - 1$$

35. $a^2x + (a-1) = (a+1)x$; despejar x .

$$a^2x + a - 1 = (a+1)x$$

$$a^2x + a - 1 = ax + x$$

$$a^2x + ax + x = 1 - a$$

$$x(a^2 + a + 1) = \frac{1-a}{(a^2+a+1)}$$

36. $\frac{a+1}{b} = \frac{a-1}{b} + \frac{b+1}{a}$, despeje d.

$$a+1 = b\left(\frac{a-1}{b}\right) + b\left(\frac{b+1}{a}\right)$$

$$a = a-1 + \frac{b^2}{a} + \frac{b}{a}$$

$$a - a + 1 = \frac{b^2}{a} + \frac{b}{a}$$

$$1 = \frac{b^2 + b}{a}$$

$$\boxed{a = b^2 + b}$$

37. $V = \frac{1}{3} \pi r^2 h$, despejar r.

$$\frac{V}{\frac{1}{3} \pi h} = r^2$$

$$\boxed{r = \sqrt{\frac{V}{\frac{1}{3} \pi h}}}$$

$$38. F = \frac{6\text{mM}}{r^2}, \text{ despejar } r.$$

$$F = \frac{6\text{mM}}{r^2}$$

$$Fr^2 = \frac{6\text{mM}}{F}$$

$$r = \sqrt{\frac{6\text{mM}}{F}}$$

$$39. a^2 b^2 = c^2; \text{ despeje } b.$$

$$b^2 = \frac{c^2 - a^2}{c^2}$$

$$b = \sqrt{c^2 - a^2}$$

$$51. 2x^2 = 8$$

$$x^2 = \frac{8}{2}$$

$$x^2 = 4$$

$$x = \sqrt{4}$$

$$x = \pm 2$$

$$52. 3x^2 - 27 = 0$$

$$3x^2 - 27$$

$$x^2 = \frac{27}{3} = 9$$

$$x^2 = 9$$

$$x = \sqrt{9}$$

$$x = \pm 3$$

$$53. (3x+2)^2 = 10$$

$$(3x+2) = \sqrt{10}$$

$$3x = -2 \pm \sqrt{10}$$

$$x = \frac{-2 \pm \sqrt{10}}{3}$$

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

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

$$2\lambda - 1 = \pm \sqrt{8}$$

$$2x = 1 \pm \sqrt{8},$$

$$x = \frac{1}{2} + \frac{\sqrt{8}}{2} \Rightarrow \frac{1}{2} + \frac{\sqrt{4 \cdot 2}}{2} = \frac{1}{2} + \frac{2\sqrt{2}}{2}$$

$$x = \frac{1}{2} + \sqrt{2}$$

$$x = \frac{1}{2} - \sqrt{2}$$

$$55. x^2 + 2x = 5$$

$$x^2 + 2x + 1 = 5 + 7$$

$$(x+7)^2 = 6$$

$$x+7 = \pm\sqrt{6}$$

$$x = 7 \pm \sqrt{6}$$

$$x = -1 + \sqrt{6}$$

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

$$56. x^2 - 4x + 2 = 0$$

$$x^2 - 4 = -2$$

$$x^2 - 4x + 4 = -2 + 4$$

$$(x-2)^2 = 2$$

$$x-2 = \sqrt{2}$$

$$x = 2 \pm \sqrt{2}$$

$$x = 2 + \sqrt{2}$$

$$x = 2 - \sqrt{2}$$

$$57. x^2 - 6x - 11 = 0$$

$$x^2 - 6x = 11$$

$$x^2 - 6x + 9 = 11 + 9$$

$$(x-3)^2 = 20$$

$$x-3 = \pm \sqrt{20}$$

$$x = 3 \pm \sqrt{20}$$

$$x = 3 \pm \sqrt{4 \times 5}$$

$$x = 3 \pm 2\sqrt{5}$$

$$x = 3 + 2\sqrt{5}$$

$$x = 3 - 2\sqrt{5}$$

$$58. x^2 + 3x - \frac{7}{4} = 0$$

$$x^2 + 3x = \frac{7}{4}$$

$$x^2 + 3x + \frac{9}{4} = \frac{7}{4} + \frac{9}{4}$$

$$(x + \frac{3}{2})^2 = \frac{16}{4} - \frac{4}{1} = 4$$

$$(x + \frac{3}{2})^2 = 4$$

$$x + \frac{3}{2} = \pm \sqrt{4}$$

$$x = -\frac{3}{2} \pm 2$$

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

$$x = \frac{1}{2}$$

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

$$\boxed{x = -\frac{1}{2}}$$

$$59. \quad 2x^2 + 8x + 1 = 0$$

$$2x^2 + 8x = -1$$

$$2(x^2 + 4x) = -1$$

$$2(x^2 + 4x + 4) = -1 + 4 - 2$$

$$2(x^2 + 4x + 4) = 7$$

$$(x+2)^2 = \frac{7}{2}$$

$$x+2 = \pm \sqrt{7/2}$$

$$x = -2 \pm \sqrt{7/2}$$

$$x = -2 + \sqrt{7/2}$$

$$\boxed{x = -2 - \sqrt{7/2}}$$

$$60. \quad 3x^2 - 6x - 1 = 0.$$

$$3x^2 - 6x = 1$$

$$3(x^2 - 2x) = 1$$

$$3(x^2 - 2x + 1) = 1 + 3(1)$$

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

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

$$x - 1 = \pm \sqrt{\frac{4}{3}}$$

$$x = 1 \pm \sqrt{\frac{4}{3}}$$

$$\pi = 1 + \sqrt{\frac{4}{3}}$$

$$\boxed{\pi = 1 - \sqrt{\frac{4}{3}}}$$

$$61. 4x^2 - x = 0$$

$$4x^2 - x + \frac{1}{4} = 0$$

$$(2x - \frac{1}{2})^2 = \frac{1}{4}$$

$$2x - \frac{1}{2} = \pm \sqrt{\frac{1}{4}}$$

$$2x = \frac{1}{2} \pm \sqrt{\frac{1}{4}}$$

$$x = \frac{\frac{1}{2}}{2} \pm \sqrt{\frac{\frac{1}{4}}{2}}$$

$$x = \frac{1}{4} \pm \sqrt{\frac{1}{8}}$$

$$62. x^2 = \frac{3}{4}x - \frac{1}{8}$$

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

$$x^2 - \frac{3}{4}x + \frac{9}{64} = -\frac{1}{8} + \frac{9}{64}$$

$$(x - \frac{3}{8})^2 = -\frac{512}{64} + \frac{9}{64}$$

$$(x - \frac{3}{8})^2 = -\frac{503}{64}$$

$$\frac{3}{4} \pm \sqrt{\frac{9}{16} - \frac{4}{8}}$$

$$\frac{3}{4} \pm \sqrt{\frac{1}{16}}$$

$$\frac{4}{3} \pm \frac{1}{4} \Rightarrow \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

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

$$63. x^2 - 2x - 15 = 0$$

$$x = \frac{2 \pm \sqrt{2^2 - 4(1)(-15)}}{2(1)}$$

$$x = \frac{2 \pm \sqrt{4+60}}{2}$$

$$x = \frac{2 \pm \sqrt{64}}{2}$$

$$x = \frac{2 \pm 8}{2}$$

$$x_1 = \frac{2+8}{2}$$

$$x = \frac{10}{2}$$

$$x = \frac{10}{2} = \frac{5}{1}$$

$$\boxed{x = 5}$$

$$x_2 = \frac{2-8}{2}$$

$$x = \frac{-6}{2}$$

$$\boxed{x_2 = -2}$$

$$64. x^2 + 5x - 6 = 0$$

$$x = \frac{-(5) \pm \sqrt{5^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{-5 \pm \sqrt{25 + 24}}{2}$$

$$x = \frac{-5 \pm \sqrt{49}}{2}$$

$$x = \frac{-5 \pm 7}{2}$$

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

$$x = \frac{1}{2} = 1$$

$$\boxed{x = 1}$$

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

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

$$\boxed{x = -6}$$

$$66. x^2 + 30x + 200 = 0$$

$$x = \frac{30 \pm \sqrt{30^2 - 4(1)(200)}}{2(1)}$$

$$x = \frac{-30 \pm \sqrt{900 - 800}}{2}$$

$$x = \frac{-30 \pm \sqrt{100}}{2}$$

$$x = \frac{-30 \pm 10}{2}$$

$$x = \frac{-30 + 10}{2}$$

$$x = \frac{-20}{2} = \frac{10}{-1}$$

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

$$\therefore x = \frac{-30 - 10}{2}$$

$$x = \frac{40}{2} = 20$$

$$\boxed{x = 20}$$

$$67. 2x^2 + x - 3 = 0$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{-1 - 5}{4}$$

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

$$\boxed{x = \frac{-3}{2}}$$

$$x = \frac{-1 \pm \sqrt{1+24}}{4}$$

$$x = \frac{-1 \pm \sqrt{25}}{4}$$

$$x = \frac{-1 \pm 5}{4}$$

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

$$x = \frac{\cancel{4}^z}{\cancel{4}^{z_1}} = \frac{1}{1}$$

$$\boxed{x = 1}$$

$$68. \quad 3x^2 + 7x + 4 = 0$$

$$x = \frac{-7 \pm \sqrt{7^2 - 4(3)(4)}}{2(3)}$$

$$x = \frac{-7 \pm \sqrt{49 - 48}}{6}$$

$$x = \frac{-7 \pm \sqrt{1}}{6}$$

$$x = \frac{-7 \pm 1}{6}$$

$$x = \frac{-7 + 1}{6}$$

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

$$\boxed{x = -1}$$

$$x = \frac{-7 - 1}{6}$$

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

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

$$69. \quad 3x^2 + 6x - 5 = 0$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(3)(-5)}}{2(3)}$$

$$x = \frac{-6 \pm \sqrt{36 + 60}}{6}$$

$$x = \frac{-6 \pm \sqrt{96}}{6}$$

$$x = \frac{-6 \pm 9.79}{6}$$

$$x = \frac{-6 + 9.79}{6}$$

$$\boxed{x = 0,637}$$

$$x_2 = \frac{-6 - 9.79}{6}$$

$$x_2 = \frac{-15.79}{6}$$

$$\boxed{x_2 = -2,63}$$

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$$70. x^2 - 6x + 1 = 0$$

$$x = \frac{6 \pm \sqrt{-6^2 - 4(1)(1)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{36 - 4}}{2}$$

$$x = \frac{6 \pm \sqrt{32}}{2}$$

$$x = \frac{6 \pm 5.65}{2}$$

$$x_1 = \frac{6 + 5.65}{2}$$

$$x = \frac{11.65}{2}$$

$$\boxed{x = 5.82}$$

$$x_2 = \frac{6 - 5.65}{2}$$

$$x = \frac{7.06}{2}$$

$$\boxed{x = 0.53}$$