

Ecuaciones 6

$$\begin{aligned} \text{a) } x^2 - 3x - 5 &= 2x + 9 \\ x^2 - 3x - 5 - 2x - 9 &= 0 \\ x^2 - 5x - 14 &= 0 \end{aligned}$$

$$\begin{array}{l|l} a=1 & -b=+5 \\ b=-5 & b^2=+25 \\ c=-14 & -4ac=+56 \\ & 2a=2 \end{array} \left| \begin{array}{l} x = \frac{5 \pm \sqrt{25+56}}{2} \\ x = \frac{5 \pm \sqrt{81}}{2} \end{array} \right.$$

$$x = \frac{5 \pm 9}{2} = \begin{cases} \frac{14}{2} = 7 \\ \frac{-4}{2} = -2 \end{cases}$$

$$\text{b) } 6x^2 - 5(x-1) = x(x+1) + 4$$

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

$$6x^2 - 5x + 5 - x^2 - x - 4 = 0$$

$$5x^2 - 6x + 1 = 0$$

$$\begin{array}{l|l} a=5 & -b=+6 \\ b=-6 & b^2=+36 \\ c=+1 & -4ac=-20 \\ & 2a=10 \end{array} \left| \begin{array}{l} x = \frac{6 \pm \sqrt{36-20}}{10} \\ x = \frac{6 \pm \sqrt{16}}{10} \end{array} \right.$$

$$x = \frac{6 \pm 4}{10} = \begin{cases} \frac{10}{10} = 1 \\ \frac{2}{10} = \frac{1}{5} \end{cases}$$

$$\text{c) } 2x^2 + \frac{x}{4} = x^2 + \frac{4x}{5} + \frac{1}{5}$$

$$\frac{40x^2}{20} + \frac{5x}{20} = \frac{20x^2}{20} + \frac{16x}{20} + \frac{4}{20}$$

$$40x^2 + 5x = 20x^2 + 16x + 4$$

$$40x^2 - 20x^2 + 5x - 16x - 4 = 0$$

$$20x^2 - 11x - 4 = 0$$

$$\begin{array}{l|l} a=20 & -b=+11 \\ b=-11 & b^2=121 \\ c=-4 & -4ac=+320 \\ & 2a=40 \end{array} \left| \begin{array}{l} x = \frac{11 \pm \sqrt{121+320}}{40} \\ x = \frac{11 \pm \sqrt{441}}{40} \end{array} \right.$$

$$x = \frac{11 \pm 21}{40}$$

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$$x = \frac{11 \pm 21}{40} = \begin{cases} \frac{32}{40} = \frac{4}{5} \\ \frac{-10}{40} = -\frac{1}{4} \end{cases}$$

Ecuaciones 7

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

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

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

$6x^2 + 6x - x - 3 + 4 = 0$

$6x^2 + 5x + 1 = 0$

$\left[\begin{array}{l} -b = -5 \quad -4ac = -24 \\ b^2 = 25 \quad 2a = 12 \end{array} \right]$

$x = \frac{-5 \pm \sqrt{25-24}}{12}$

$x = \frac{-5 \pm 1}{12}$

$x = \left\{ \begin{array}{l} \frac{-4}{12} = -\frac{1}{3} \\ \frac{-6}{12} = -\frac{1}{2} \end{array} \right.$

4e) $\frac{2x+2}{3} + \frac{x^2-x}{5} = \frac{3x+7}{10}$

$\frac{20x+20}{30} + \frac{6x^2-6x}{30} = \frac{9x+21}{30}$

$6x^2 + 20x - 6x - 9x + 20 - 21 = 0$

$6x^2 + 5x - 1 = 0$

$\left[\begin{array}{l} -b = -5 \quad -4ac = +24 \\ b^2 = 25 \quad 2a = 12 \end{array} \right]$

$x = \frac{-5 \pm \sqrt{25+24}}{12}$

$x = \frac{-5 \pm \sqrt{49}}{12}$

$x = \frac{-5 \pm 7}{12}$

$x = \left\{ \begin{array}{l} \frac{2}{12} = \frac{1}{6} \\ \frac{-12}{12} = -1 \end{array} \right.$

11a) $x^2 - 10x + 21 = 0$
 $\left[\begin{array}{l} -b = +10 \quad -4ac = -84 \\ b^2 = 100 \quad 2a = 2 \end{array} \right]$

$x = \frac{+10 \pm \sqrt{100-84}}{2} = \frac{10 \pm \sqrt{16}}{2} = \frac{10 \pm 4}{2} = \left\{ \begin{array}{l} 7 \\ 3 \end{array} \right.$

11b) $x^2 + 2x - 3 = 0$

$\left[\begin{array}{l} -b = -2 \quad -4ac = +12 \\ b^2 = 4 \quad 2a = 2 \end{array} \right]$

$x = \frac{-2 \pm \sqrt{4+12}}{2} = \frac{-2 \pm 4}{2} = \left\{ \begin{array}{l} 1 \\ -3 \end{array} \right.$

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

$x^2 - \frac{1}{4} = \frac{1x}{20} - \frac{1}{5}$

$\frac{20x^2 - 5}{20} = \frac{1x - 4}{20}$

$20x^2 - 1x - 1 = 0$

$\left[\begin{array}{l} -b = +1 \quad -4ac = +80 \\ b^2 = +1 \quad 2a = 40 \end{array} \right]$

$x = \frac{+1 \pm \sqrt{1+80}}{40}$

$x = \frac{+1 \pm 9}{40}$

$x = \left\{ \begin{array}{l} \frac{10}{40} = \frac{1}{4} \\ \frac{-8}{40} = -\frac{1}{5} \end{array} \right.$

Ecuaciones 7

12b) $\frac{x}{2} \left(x + \frac{1}{30} \right) = \frac{x}{3} \left(x + \frac{2}{5} \right)$

$\frac{x^2}{2} + \frac{x}{60} = \frac{x^2}{3} + \frac{2x}{15}$

$\frac{30x^2 + x}{60} = \frac{20x^2 + 8x}{60}$

$30x^2 - 20x^2 + x - 8x = 0$

$10x^2 - 7x + 0 = 0$

$\left[\begin{array}{l} -b = +7 \quad -4ac = 0 \\ b^2 = 49 \quad 2a = 20 \end{array} \right]$

~~$x = \frac{+7 \pm \sqrt{49+0}}{20}$~~

$x = \frac{+7 \pm \sqrt{49+0}}{20}$

~~$x = \frac{+7 \pm 7}{20}$~~

$x = \frac{+7 \pm 7}{20}$

~~$x = \frac{14}{20} = \frac{7}{10}$~~

$x = \left\{ \begin{array}{l} \frac{14}{20} = \frac{7}{10} \\ \frac{0}{20} = 0 \end{array} \right.$

Ecuaciones 8

11a) $x^2 + 9x + 40 = 0$
 a b c

$$x = \frac{-9 \pm \sqrt{81 - 160}}{2}$$

$$x = \frac{-9 \pm \sqrt{-79}}{2} = \text{Sim Sol.}$$

e) $15x^2 - 16x + 4 = 0$
 a b c

$$x = \frac{16 \pm \sqrt{256 - 240}}{30}$$

$$x = \frac{16 \pm 4}{30} = \begin{cases} \frac{2}{3} \\ \frac{12}{30} = \frac{2}{5} \end{cases}$$

f) $14x^2 + 5x - 1 = 0$
 a b c

$$x = \frac{-5 \pm \sqrt{25 + 56}}{28}$$

$$x = \frac{-5 \pm \sqrt{81}}{28}$$

d) $5x^2 + 14x - 3 = 0$

$$x = \frac{-14 \pm \sqrt{196 + 60}}{10}$$

$$x = \frac{-14 \pm \sqrt{256}}{10}$$

$$x = \frac{-14 \pm 16}{10}$$

$$x = \frac{-14 \pm 16}{10}$$

$$x = \begin{cases} \frac{2}{10} = \frac{1}{5} \\ \frac{-30}{10} = -3 \end{cases}$$

$$x = \frac{-5 \pm 9}{28}$$

$$x = \begin{cases} \frac{4}{28} = \frac{1}{7} \\ \frac{-14}{28} = -\frac{1}{2} \end{cases}$$

$$x = \begin{cases} \frac{4}{28} = \frac{1}{7} \\ \frac{-14}{28} = -\frac{1}{2} \end{cases}$$

Ecuaciones 8

12c) $\frac{x}{3} \left(x - \frac{1}{20}\right) = \frac{x^2}{2} - \frac{1}{15} \left(2x - \frac{1}{2}\right)$

$$\frac{x^2}{3} - \frac{x}{60} = \frac{x^2}{2} - \frac{2x}{15} + \frac{1}{30}$$

$$20x^2 - x = 30x^2 - 8x + 2$$

$$20x^2 - 30x^2 - x + 8x - 2 = 0$$

$$-10x^2 + 7x - 2 = 0$$

$$x = \frac{-7 \pm \sqrt{49 - 80}}{-20}$$

$$x = \frac{-7 \pm \sqrt{-31}}{-20} = \text{Sim Sol.}$$

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

$$\frac{3x^2 + 6x}{6} = \frac{4x^2 - 10 - 6}{6}$$

$$3x^2 + 6x = 4x^2 - 10 - 6$$

$$3x^2 - 4x^2 + 6x + 10 + 6 = 0$$

$$-x^2 + 6x + 16 = 0$$

$$x^2 - 6x - 16 = 0$$

a b c

$$x = \frac{6 \pm \sqrt{36 + 64}}{2}$$

$$x = \frac{6 \pm 10}{2}$$

$$x = \begin{cases} 8 \\ -2 \end{cases}$$

$$1g) \quad x^2 + 6 = 10$$

$$x^2 = 4$$

$$x = \pm 2$$

$$1i) \quad \frac{5x^2}{8} = \frac{2}{5}$$

$$\frac{25x^2}{40} = \frac{16}{40}$$

$$25x^2 = 16$$

$$x^2 = \frac{16}{25}$$

$$x = \frac{\sqrt{16}}{\sqrt{25}} = \pm \frac{4}{5}$$

Corona Ecuaciones 9

$$3c) \quad x^2 + x - 12 = 0$$

a b c

$$x = \frac{-1 \pm \sqrt{1 + 48}}{2}$$

$$x = \frac{-1 \pm 7}{2} = \begin{cases} 3 \\ -4 \end{cases}$$

$$3e) \quad 2x^2 - 7x + 6 = 0$$

a b c

$$x = \frac{7 \pm \sqrt{49 - 48}}{4}$$

$$x = \frac{7 \pm 1}{4} = \begin{cases} \cancel{4} & \times \frac{3}{2} \\ \cancel{4} & \times 2 \end{cases}$$

Corona Ecuaciones 9

$$1k) \quad \frac{4x^2}{25} - \frac{1}{25} = 0$$

$$4x^2 - 1 = 0$$

$$4x^2 = 1$$

$$x^2 = \frac{1}{4}$$

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

$$2i) \quad 2x + x^2 = 7x$$

$$x^2 - 5x = 0$$

$$x(x-5) = 0$$

$$\begin{cases} x = 0 \\ x - 5 = 0 \\ \quad \quad \quad \downarrow \\ \quad \quad \quad x = 5 \end{cases}$$

$$3g) \quad x^2 + 6x + 9 = 0$$

a b c

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

$$x = \frac{-6 \pm 0}{2} = \begin{cases} -3 \\ -3 \end{cases}$$

$$2g) \quad 5x^2 = 4x$$

$$5x^2 - 4x = 0$$

$$x(5x-4) = 0$$

$$\begin{cases} x = 0 \\ 5x - 4 = 0 \\ \quad \quad \quad \downarrow \\ \quad \quad \quad x = \frac{4}{5} \end{cases}$$

$$2k) \quad \frac{x^2}{2} = \frac{x}{3} \quad | \quad x(3x-2) = 0$$

$$\frac{3x^2}{6} = \frac{2x}{6} \quad \left\{ \begin{array}{l} x = 0 \\ 3x - 2 = 0 \\ \quad \quad \quad \downarrow \\ \quad \quad \quad x = \frac{2}{3} \end{array} \right.$$

$$3x^2 = 2x$$

$$3x^2 - 2x = 0$$

