N° 79a

$2x^2 + 2x - 40 = 0$

$\Delta = b^2 - 4 \cdot a \cdot c$

$\Delta = (2)^2 - 4 \cdot 2 \cdot (-40)$

$\Delta = 4 + 320 = 324$

$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-2 \pm \sqrt{324}}{4} = \frac{-2 \pm 18}{4}$ $\quad \frac{-2-18}{4} = -5$ $\quad \frac{-2+18}{4} = \frac{16}{4} = 4$

$S = \{x_1 = -5 ; x_2 = 4\}$

N° 79b

$3x^2 - x + 5 = 0$

$\Delta = b^2 - 4ac = (-1)^2 - 4 \cdot 3 \cdot 5 = -60 + 1 = -59$

$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{+1 \pm \sqrt{-59}}{6}$ = IMPOSSIBILE $\emptyset$

N° 10.1.a

$(x-2)(3x+1)-9 = 9(1-x)$

$3x^2+1x-6x-2-9 = 9-9x$

$3x^2+1x-6x-2-9-9+9x=0$

$3x^2+6x-20=0$

$\Delta = b^2-4\cdot ac = (6)^2-4\cdot 3\cdot(-20) = 196$

$x_{1,2} = \frac{-b\pm\sqrt{\Delta}}{2a} = \frac{-6\pm\sqrt{196}}{6} = \frac{-6-14}{6} = -5$

$\frac{-6+14}{6} = 2$

$S=\{x_1=-5 ; x_2=2\}$

N° 10.1.b

$(3x-1)(x+3) = 6x-x(x+1)$

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

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

$4x^2-3=0$ PURA

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

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

$S=\{x_{1,2}=\pm\sqrt{\frac{3}{4}}\}$

N° 107 a

$$2x - 1 + 4(x-3) + (x-1)^2 = 0$$

$$\cancel{2x} - \cancel{1} + 4x - 12 + x^2 \cancel{+1} \cancel{-2x} = 0$$

$$x^2 + 4x - 12 = 0$$

$$\frac{\Delta}{4} = \left(\frac{b}{2}\right)^2 - a \cdot c = (2)^2 - 1 \cdot (-12) = 4 + 12 = 16$$

$$x_{1,2} = \frac{-\frac{b}{2} \pm \sqrt{\frac{\Delta}{4}}}{a} = -2 \pm \sqrt{16} = -2 \pm 4 \begin{cases} -2-4 = -6 \\ -2+4 = 2 \end{cases}$$

$$S = \{x_1 = -6 ; x_2 = 2\}$$

N° 107 b

N° 209

$$\frac{2(1+2x)}{x^2-x-2} - \frac{x^2}{2-x} = \frac{7x}{x-2} + \frac{2+x^3}{(x-2)(x+1)}$$

$$\frac{2(1+2x)}{(x-2)(x+1)} + \frac{x^2}{x-2} = \frac{7x}{x-2} + \frac{2+x^3}{(x-2)(x+1)}$$

C.E

$$\left(\frac{2+4x+x^2(x+1)}{(x-2)(x+1)}\right) = \left(\frac{7x(x+1)+2+x^3}{(x-2)(x+1)}\right) \quad \begin{array}{l} x-2\neq 0 \quad x\neq 2 \\ x+1\neq 0 \quad x\neq -1 \end{array}$$

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

$$2+4x+x^2-7x^2-7x-2=0$$

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

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

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

$$x(2x+1)=0$$

$x=0$ $\qquad$ $2x+1=0$

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

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

$$S=\left\{x_1=0\,;\ x_2=-\frac{1}{2}\right\}$$

№ 213

C.E.:

$x+3 \neq 0 \quad x \neq -3$

$x+2 \neq 0 \quad x \neq -2$

$$\frac{x^2+8x+11}{x^2+5x+6} + \frac{x-1}{(x+3)} = \frac{x-2}{x+2}$$

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

$$\left(\frac{x^2+8x+11+(x-1)(x+2)}{(x+3)(x+2)}\right) = \left(\frac{(x-2)(x+3)}{(x+3)(x+2)}\right)$$

$$\cancel{x^2}+8x+11+x^2-x-2+2x = \cancel{x^2}-2x-6+3x$$

$$+8x+11+x^2-x-2+2x+2x+6-3x=0$$

$$x^2+8x+15=0$$

$$\frac{\Delta}{4} = (4)^2 - 1\cdot 15 = 16-15 = 1$$

$$x_{1/2} = \frac{-b \pm \sqrt{\Delta}}{a} = \frac{-8 \pm 1}{1} = \begin{cases} -5 \\ -3 \end{cases}$$

$S: \{-5; -3\}$

N° 251

-3 $2x(a-1) - 2(a-2) = \frac{1}{2}\left[(x+1)^2 + (x-1)^2\right]$

-2 $2ax - 2x - 2a + 4 = \frac{1}{2}\left[x^2 + 1 + 2x + x^2 + 1 - 2x\right]$

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

$2ax - 2x - 2a + 4 = x^2 + 1$

$2ax - 2x - 2a + 4 - x^2 - 1 = 0$

$-x^2 + (2a-2)x + 3 - 2a = 0$

$\boxed{x^2 - x(2a-2) + 2a - 3 = 0}$

COMPLETA

$\Delta = b^2 - 4ac = (-2a+2)^2 - 4 \cdot 1 \cdot (2a-3) = 4a^2 + 4 - 8a - 8a + 12 =$

$4a^2 - 16a + 16 = (2a-4)^2$

$x_{1,2} = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{+2a - 2 \pm (\sqrt{(2a-4)^2})}{2} = \frac{2a - 2 \pm 2a - 4}{2}$

$x_1 = \frac{2a - 2 - 2a + 4}{2} = 1$

$x_2 = \frac{2a - 2 + 2a - 4}{2} = \frac{4a - 6}{2} = \frac{2(2a-3)}{2} = 2a - 3$

$S: \{x_1 = 1; x_2 = 2a - 3\}$

PURA

$2a - 2 = 0 \qquad \frac{2a}{2} = \frac{2}{2} \qquad a = 1$

$x^2 - x(2-2) + 2 - 3 = 0$

$x^2 - 1 = 0$

$x^2 = 1$

$x^2 = \pm\sqrt{1}$

$S: \{x_{1,2} = \pm\sqrt{1}\}$

SPURIA

$2a - 3 = 0 \qquad \frac{2a}{2} = \frac{3}{2} \qquad a = \frac{3}{2}$

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

$x^2 - x = 0$

$+ x(x-1) = 0$

$x = 0$ ~~ou~~ $x - 1 = 0 \quad x = 1$

$S: \{x_1 = 0 ; x_2 = 1\}$

Nr 53

$$x(3a+x+1)+(3a+x-1)(6a+x)=2[1+3(3a+1)]$$

$$3xa+x^2+x+18a^2+6xa-6a+3ax+x^2-x=2[1+9a^2+3]$$

$$3ax+x^2+x+\cancel{18a^2}+6ax-6a+3ax+x^2-x=2+\cancel{18a^2}+6a$$

$$3ax+x^2+\cancel{x}+\underline{6ax}-6a+\underline{3ax}+x^2-\cancel{x}-2-6a=0$$

$$12ax+2x^2-2(1+6a)=0$$

$$+2x^2+12ax-2(1+6a)=0$$

$$\boxed{x^2+6ax-(1+6a)=0}$$

COMPLETX

$$\Delta=b^2-4\cdot a\cdot c=(6a)^2-4\cdot 1\cdot(-1-6a)=36a^2+4+24a=$$

$$=(6a+2)^2$$

$$x_{1,2}=\frac{-b\pm\sqrt{\Delta}}{2a}=\frac{-6a\pm\sqrt{(6a+2)^2}}{2}=\frac{-6a\pm 6a+2}{2}=$$

$$\cancel{x_1=\frac{-12a-6a-2}{2}=\frac{-20a-2}{2}=\frac{+2(-10a-1)}{2}=-10a-1}$$

$$x_1=\frac{-6a-6a-2}{2}=\frac{-12a-2}{2}=\frac{-2(6a+1)}{2}$$

$$x_2=\frac{-6a+6a+2}{2}=1$$

$$S:\left\{x_1=-(6a+1)\quad x_2=1\right\}$$

PURA

$\frac{6a}{6} = \frac{0}{6}$ $a=0$

$x^2 - 2 = 0$

$x^2 = 2$

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

S: $\{x_{1,2} = \pm\sqrt{2}\}$

SPURIA

$1 + 6a = 0$ $\frac{6a}{6} = \frac{1}{6}$

$x^2 + 6\left(-\frac{1}{6}\right)x = 0$

$x^2 - 1x = 0$

$x(x-1) = 0$

$x = 0$ $x - 1 = 0$ $x = 1$

S: $\{x_1 = 0 ; x_2 = 1\}$