MA384 Fundamentos para el Cálculo
Ecuaciones polinómicas

Resuelve:

1.

$$(2x-5)(3x^2+7x-6)=0$$

$$3x^2+7x-6=0$$

$3x$ — $-2 \rightarrow -2x$

x — $3 \rightarrow 9x$

$7x$

$$(2x-5)(3x-2)(x+3)=0$$

$2x-5=0$ → $2x=5$ → $x=\frac{5}{2}$ ✓

$3x-2=0$ → $3x=2$ → $x=\frac{2}{3}$ ✓

$x+3=0$ → $x=-3$

$$CS=\left\{-3;\frac{2}{3};\frac{5}{2}\right\}$$

2.

$$(3x^2+10x+3)(x-5)=0$$

$$3x^2+10x+3=0$$

$3x$ — $1 \rightarrow x$

x — $3 \rightarrow 9x$

$10x$

$$(3x+1)(x+3)(x-5)=0$$

$3x+1=0$ → $3x=-1$ → $x=-\frac{1}{3}$ ✓

$x+3=0$ → $x=-3$ ✓

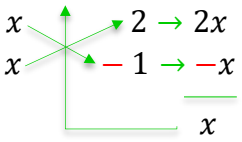
$x-5=0$ → $x=5$

$$CS=\left\{-3;-\frac{1}{3};5\right\}$$

3.

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

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



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

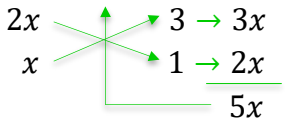
$$x + 2 = 0 \quad \text{V} \quad x - 1 = 0$$
$$x = -2 \qquad\qquad x = 1$$

$$CS = \{-2; 1\}$$

4.

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

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



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

$$2x - 3 = 0 \quad \text{V} \quad 2x + 3 = 0 \quad \text{V} \quad x + 1 = 0$$
$$2x = 3 \qquad\qquad 2x = -3 \qquad\qquad x = -1$$
$$x = \frac{3}{2} \qquad\qquad x = -\frac{3}{2}$$

$$CS = \left\{-\frac{3}{2}; -1; \frac{3}{2}\right\}$$

5.

$$8x^3 = 32x$$

$$8x^3 - 32x = 0$$

$$8x(x^2 - 4) = 0$$

$$8x(x + 2)(x - 2) = 0$$

$$8x = 0 \quad \text{V} \quad x + 2 = 0 \quad \text{V} \quad x - 2 = 0$$
$$x = 0 \qquad\qquad x = -2 \qquad\qquad x = 2$$

$$CS = \{-2; 0; 2\}$$

6.

$$6x^3 = -54x$$

$$6x^3 + 54x = 0$$

$$6x(x^2 + 9) = 0$$

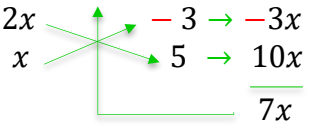
$6x = 0$ $\quad x = 0$ $\quad \vee$ $\quad x^2 + 9 = 0$ $\quad CS = \{\ \}$

$$CS = \{0\}$$

7.

$$(2x^2 + 7x - 15)(3ax + 4) = 0;\ a > 0$$

$$2x^2 + 7x - 15 = 0$$



$$(2x - 3)(x + 5)(3ax + 4) = 0$$

$2x - 3 = 0$ $\quad 2x = 3$ $\quad x = \frac{3}{2}$ $\quad \vee$ $\quad x + 5 = 0$ $\quad x = -5$ $\quad \vee$ $\quad 3ax + 4 = 0$ $\quad x = -\frac{4}{3a}$

$$CS = \left\{-5; -\frac{4}{3a}; \frac{3}{2}\right\}$$

8.

$$x^3 - 5ax^2 - 4x + 20a = 0$$

$$x^2(x - 5a) - 4(x - 5a) = 0$$

$$(x - 5a)(x^2 - 4) = 0$$

$$(x - 5a)(x + 2)(x - 2) = 0$$

$x - 5a = 0$ $\quad x = 5a$ $\quad \vee$ $\quad x + 2 = 0$ $\quad x = -2$ $\quad \vee$ $\quad x - 2 = 0$ $\quad x = 2$

$$CS = \{-2; 2; 5a\}$$

9.

$$x^3 - 3x^2 + 5x - 15 = 0$$

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

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

$x^2 + 5 = 0$ $\quad CS = \{\ \}$ $\quad \vee$ $\quad x - 3 = 0$ $\quad x = 3$

$$CS = \{3\}$$

10.

$$4x^3 - 4x^2 - 25x + 25 = 0$$

$$4x^2(x-1) - 25(x-1) = 0$$

$$(4x^2 - 25)(x-1) = 0$$

$$(2x+5)(2x-5)(x-1) = 0$$

$2x + 5 = 0$ $\quad\vee\quad$ $2x - 5 = 0$ $\quad\vee\quad$ $x - 1 = 0$

$x = -\frac{5}{2}$ $\quad\vee\quad$ $x = \frac{5}{2}$ $\quad\vee\quad$ $x = 1$

$$CS = \left\{-\frac{5}{2}; 1; \frac{5}{2}\right\}$$