

Esercitazione: equazioni e diseguazioni algebriche

Esercizi

Risolvere le seguenti equazioni di primo grado:

$$-[11(x+2) - 10^2] = [10(x-5) + 3x](-2) + x \quad \left[\frac{11}{7}\right]$$

$$(x-4)^2 - 3(x-2)(x+1) = -2x(x+1) - 4x \quad [-22]$$

$$(a-2)^3 + (a-5)(a+5) - a(1+a^2) = -5a^2 + 4a - 2 \quad \left[\frac{31}{7}\right]$$

$$2x(x-3)(x+1) + (2x-3)^2 = (x+1)^2 + 2x^3 - x^2 \quad \left[\frac{2}{5}\right]$$

$$(x+1)^3 - (x-3)(x+1)(x-1) = 6x^2 + 4x + 5 \quad [\text{impossibile}]$$

$$(x-3)^3 + 2(3x+1)^2 = (x+3)^3 - (4+x)^2 + (x+3)(x-4) \quad \left[\frac{8}{7}\right]$$

$$(3x+2)(x^2-x+1) + 2x = (3x^2+1)(x-2) + (5x+4)(x-1) + 3x+8 \quad [\text{indeterminata}]$$

$$\frac{5x+1}{6} - \frac{5x-1}{6} = \frac{3-x}{4} - \frac{1}{6}x \quad [1]$$

$$\frac{x}{2} + 9\left[\left(2x - \frac{1}{3}\right)\left(2x + \frac{1}{3}\right) - \left(2x - \frac{1}{3}\right)^2\right] = \frac{3x-2}{6} \quad \left[\frac{5}{36}\right]$$

Esercizi

Risolvere le seguenti equazioni prodotto:

$$(-2x + 2)\left(\frac{1}{5}x + 1\right) = 0$$

$$[-5; 1]$$

$$7x^2\left(x + \frac{1}{3}\right) = 0$$

$$\left[-\frac{1}{3}; 0\right]$$

$$\frac{x^4}{3}(6x - 4) = 0$$

$$\left[0; \frac{2}{3}\right]$$

$$(2x - 6)\left[\left(3x - \frac{1}{2}\right) \cdot 2 - 2\right] = 0$$

$$\left[\frac{1}{2}; 3\right]$$

$$(7 - x)^2\left(-\frac{1}{2} - 3x\right) = 0$$

$$\left[-\frac{1}{6}; 7\right]$$

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

$$\left[-\frac{3}{2}; 4\right]$$

$$\frac{6 + x}{6} \cdot \frac{-x + 2}{2} = 0$$

$$[-6; 2]$$

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

$$\left[-\frac{1}{2}; 0; 3\right]$$

$$2\left(\frac{x - 1}{4}\right)\left(\frac{1}{2}x + \frac{3}{4}\right) = 0$$

$$\left[-\frac{3}{2}; 1\right]$$

$$-(x - 7)(8 - x)^3 = 0$$

$$[7; 8]$$

$$\frac{1}{3}x(x - 4)^2(x + 9) = 0$$

$$[-9; 0; 4]$$

$$(x - 2)^2 \cdot 2x = 0$$

$$[0; 2]$$

$$(4x - 2)(10x - 20) = 0$$

$$\left[\frac{1}{2}; 2\right]$$

Esercizi

Risolvere le seguenti equazioni di secondo grado complete:

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

[impossibile]

$$9x^2 - 30x + 25 = 0$$

$\left[\frac{5}{3} \text{ doppia}\right]$

$$a^2 + 7a - 60 = 0$$

$[-12; 5]$

$$4x^2 - 12x - 7 = 0$$

$\left[-\frac{1}{2}; \frac{7}{2}\right]$

$$x^2 + 6x + 8 = 0$$

$[-2; -4]$

$$6 = \frac{x^2}{2} + 2x$$

$[-6; 2]$

$$9x + 5x^2 = 2$$

$\left[-2; \frac{1}{5}\right]$

$$(t - 3t^2) \cdot 12 - 1 = 0$$

$\left[\frac{1}{6} \text{ doppia}\right]$

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

[impossibile]

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

$[2 \pm \sqrt{2}]$

$$6x^2 + 37x - 13 = 0$$

$\left[-\frac{13}{2}; \frac{1}{3}\right]$

$$x^2 - \frac{x}{6} - \frac{1}{3} = 0$$

$\left[-\frac{1}{2}; \frac{2}{3}\right]$

$$3x^2 + 5x + 9 = 0$$

[impossibile]

$$\frac{x^2}{2} - \sqrt{2}x - 8 = 0$$

$[-2\sqrt{2}; 4\sqrt{2}]$

Esercizi

Risolvere le seguenti equazioni di secondo grado incomplete:

$$4x^2 - 16 = 0 \quad [\pm 2]$$

$$-(1 + \sqrt{2})x^2 = 0 \quad [0 \text{ doppia}]$$

$$3(x^2 + x) = 0 \quad [0; -1]$$

$$5^{14}x^2 - 5^{12} = 0 \quad \left[\pm \frac{1}{5}\right]$$

$$2x^2 = \frac{7}{2}x \quad \left[0; \frac{7}{4}\right]$$

$$-\sqrt{3}t^2 = -3 \quad [\pm \sqrt[4]{3}]$$

$$-3\sqrt{21}x^2 = 0 \quad [0 \text{ doppia}]$$

$$2\sqrt{2}x^2 - \frac{3}{4}x = 0 \quad \left[0; \frac{3\sqrt{2}}{16}\right]$$

$$\frac{3}{10}x^2 = -\frac{1}{37}x^2 \quad [0 \text{ doppia}]$$

$$3x^2 = x(6 + \sqrt{3}x) \quad [0; 3 + \sqrt{3}]$$

$$(\sqrt{2} - x)^2 + 3x^2 + 2x\sqrt{2} = 4 \quad \left[\pm \frac{\sqrt{2}}{2}\right]$$

$$5x^2 + \sqrt{3}x^2 = \frac{1}{2}(\sqrt{2} - 2)x^2 \quad [0 \text{ doppia}]$$

$$(\sqrt{3} - 1)(1 + \sqrt{3})x + \sqrt{2}x^2 = 0 \quad [0; -\sqrt{2}]$$

$$\left(\frac{x+1}{2}\right)^2 = \frac{1}{3} \cdot \frac{3x}{2} + \frac{5}{4} \quad [\pm 2]$$

$$\left(\frac{1}{3}x - 1\right)^2 - (1 - x)^2 = 0 \quad \left[0; \frac{3}{2}\right]$$

$$2 \cdot 3^{\frac{1}{2}}x^2 - 6 = 0 \quad \left[\pm 3^{\frac{1}{4}}\right]$$

$$(10^3x + 0,1)^2 = 200x \quad [\text{impossibile}]$$

$$3(2 - x)(x + 2) = x^2 \quad [\pm \sqrt{3}]$$

Esercizi

Risolvere le seguenti equazioni fratte:

$$\frac{2}{x+5} = 0$$

$$\frac{6x}{x^2 - 6x} = 0$$

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

$$\frac{5}{x+2} = 0$$

$$\frac{x-5}{x^2+10x} = 0$$

$$\frac{x^2 - 6x + 9}{3x^2} = 0$$

$$\frac{x^2 - 16}{x^2 - 8x + 16} = 0$$

$$\frac{x^2 - 6x + 9}{x^2 - 9} = 0$$

$$\frac{9x^2 - 30x + 25}{3x - 5} = 0$$

$$\frac{(2x+1)(2x-7)}{4x^2 - 12x - 7} = 0$$

$$\frac{(x+1)(2-3x)}{6x^2 - x - 2} = 0$$

$$\frac{(2x-3)(x+7)(3-x)}{x^2 - 9} = 0$$

Esercizi

Risolvere le seguenti equazioni di grado superiore al secondo:

$32x^5 + 1 = 0$	$[-\frac{1}{2}]$	$16x^4 - 81 = 0$	$[-\frac{3}{2}, \frac{3}{2}]$
$81x^4 + 1 = 0$	[impossibile]	$2x^4 - 1250 = 0$	$[\pm 5]$
$2x^3 - 16 = 0$	[2]	$\frac{1}{10}x^7 - \frac{64}{5} = 0$	[2]
$x^6 - 1 = 0$	$[\pm 1]$	$(3x + 1)^6 = 64$	$[-1; \frac{1}{3}]$
$81x^4 - 1 = 0$	$[\pm \frac{1}{3}]$	$(x^4 - 1)^3 = -8$	[impossibile]
$x^4 - 5x^2 + 4 = 0$	$[\pm 1; \pm 2]$	$8x^4 - 34x^2 - 9 = 0$	$[\pm \frac{3\sqrt{2}}{2}]$
$x^4 - 10x^2 + 9 = 0$	$[\pm 1; \pm 3]$	$16x^4 + 63x^2 - 4 = 0$	$[\pm \frac{1}{4}]$
$x^4 - 7x^2 + 6 = 0$	$[\pm 1; \pm \sqrt{6}]$	$x^4 - \frac{13}{3}x^2 + \frac{4}{3} = 0$	$[\pm \frac{\sqrt{3}}{3}; \pm 2]$
$x^6 - 4x^3 + 3 = 0$	$[1; \sqrt[3]{3}]$	$x^4 + \frac{15}{4}x^2 = 1$	$[\pm \frac{1}{2}]$
$x^8 - 4x^4 + 3 = 0$	$[\pm 1; \pm \sqrt[4]{3}]$	$x^4 - \frac{85}{9}x^2 + 4 = 0$	$[\pm \frac{2}{3}; \pm 3]$
$x^6 + 13x^3 = -40$	$[-2; -\sqrt[3]{5}]$	$-x^4 + \frac{65}{4}x^2 - 4 = 0$	$[\pm \frac{1}{2}; \pm 4]$
$x^{16} + 10x^8 + 9 = 0$	[impossibile]		

Esercizi

Risolvere le seguenti disequazioni di primo grado:

$$-3(x+1) + 5 \leq 7 - x \quad \left[x \geq -\frac{5}{2} \right]$$

$$6x - 3(x+1) > 5 + 3x \quad [\text{impossibile}]$$

$$2(-4-x) + x^2 < (x-1)^2 - 6 \quad [\forall x \in \mathbb{R}]$$

$$4(x-1) - 2(5-3x) \leq 6 \quad [x \leq 2]$$

$$-[x + (12 - 4x)] + 3 > x \quad \left[x > \frac{9}{2} \right]$$

$$\frac{2}{3}(1-3x) < x + \frac{1}{3} \quad \left[x > \frac{1}{9} \right]$$

$$\frac{3}{2}x + 2 \geq \frac{2x+1}{8} \quad \left[x \geq -\frac{3}{2} \right]$$

$$\frac{x-4}{4} - \frac{1+x}{2} \geq 1 \quad [x \leq -10]$$

$$1 - \frac{11-x}{12} > \frac{x+3}{4} - \frac{2(x+1)}{3} \quad [x > 0]$$

$$\frac{2y+1}{15} - 3 \geq \frac{4}{5} + y - \frac{y}{3} \quad [y \leq -7]$$

$$\frac{1}{3}(1+x) < \frac{5x-2}{6} - \frac{x}{2} \quad [\text{impossibile}]$$

$$\left(y + \frac{1}{2}\right)\left(y - \frac{1}{2}\right) + 3y\left(2 - \frac{1}{3}y\right) \geq 8 \quad \left[y \geq \frac{11}{8}\right]$$

$$2x(x+2) - \frac{1}{2}x(2x-3) > x^2 + x + 1 \quad \left[x > \frac{2}{9}\right]$$

$$3 - \left(-x^2 + \frac{1}{4}\right) \geq \frac{1}{2}\left(\frac{3}{2} + x\right)(2x-3) \quad [\forall x \in \mathbb{R}]$$

$$\frac{a}{2}\left(\frac{1}{3}a+1\right) + \frac{5}{6}(a-2)^2 \leq 3 + a^2 \quad \left[a \geq \frac{2}{17}\right]$$

Esercizi

Risolvere i seguenti sistemi di disequazioni:

$$\begin{cases} -x \leq 0 \\ -2 - 3x > 0 \end{cases} \quad [\text{impossibile}]$$

$$\begin{cases} x + 10 > 0 \\ 1 - \frac{x}{2} \geq 0 \end{cases} \quad [-10 < x \leq 2]$$

$$\begin{cases} 2t + 5 > 5t - 2 \\ 3(t + 4) - t \leq 0 \end{cases} \quad [t \leq -6]$$

$$\begin{cases} (3x + 5)2 - 5x \geq -9x \\ 4(7 - x) - (3 - 5x) \geq 8 \end{cases} \quad [x \geq -1]$$

$$\begin{cases} \frac{x}{3} + 1 > \frac{1 + x}{6} \\ 5(x - 2) \leq 3(1 - 2x) \end{cases} \quad \left[-5 < x \leq \frac{13}{11}\right]$$

$$\begin{cases} x - 2 > 0 \\ -7x \leq 0 \\ 8x + 4 > 0 \end{cases} \quad [x > 2]$$

$$\begin{cases} 2\left(-x + \frac{1}{2}\right) \leq 3 \\ 5x - 1 < 1 \\ -4x + 12 > 3(4 - x) \end{cases} \quad [-1 \leq x < 0]$$

$$\begin{cases} 5x + 1 \leq -2(x - 11) \\ 4 - 4x > 11 \\ x - 3 > -(1 - x) \end{cases} \quad [\text{impossibile}]$$

$$\begin{cases} x^2 + 3 \leq (x + 2)^2 \\ 8x - 3(x - 2) < 2x \end{cases} \quad [\text{impossibile}]$$

$$\begin{cases} x - 5 < 0 \\ 3 - x > 0 \\ x + 8 > 0 \end{cases} \quad [-8 < x < 3]$$

Esercizi

Risolvere le seguenti equazioni con valore assoluto:

$$|1 - x| = 3x \quad \left[\frac{1}{4} \right]$$

$$|4x - 3| = 5x \quad \left[\frac{1}{3} \right]$$

$$1 - |x| = x \quad \left[\frac{1}{2} \right]$$

$$|3x - 5| = 2x + 1 \quad \left[\frac{4}{5}; 6 \right]$$

$$\left| 3x + \frac{5}{2} \right| = 7x - \frac{1}{2} \quad \left[\frac{3}{4} \right]$$

$$|5x - 3| = 2(2x - 7) - 2(x + 3) \quad [\forall x \in \mathbb{R}]$$

$$|2a - 1| + 3 = 3a + 4 \quad [0]$$

$$|4x + 5| = (2 - x)(2 + x) + 3 + x^2 \quad \left[\frac{1}{2}; -3 \right]$$

$$|(x + 4)(x - 1) - x^2| = 2(2 - x) + 1 \quad \left[\frac{9}{5}; -1 \right]$$

Esercizi

Risolvere le seguenti disequazioni con valore assoluto:

$$|4x^2 - 1| + 5 < 0 \quad [\nexists x \in \mathbb{R}]$$

$$|x| + \frac{2}{3} > 2|x| - \frac{1}{6} \quad \left[-\frac{5}{6} < x < \frac{5}{6}\right]$$

$$2 + |3x - 4| < 1 - |3x - 4| \quad [\nexists x \in \mathbb{R}]$$

$$\frac{1}{7}|x - 2| < 2 \quad [-12 < x < 16]$$

$$\left|x - 3\left(x + \frac{2}{3}\right)\right| - 4 < 0 \quad [-3 < x < 1]$$

$$|(x - 4)(x - 1) - x^2| < 1 \quad \left[\frac{3}{5} < x < 1\right]$$

$$|3x + 5| - 4 > 6 \quad \left[x < -5 \vee x > \frac{5}{3}\right]$$

$$|x - 6| > 3 \quad [x < 3 \vee x > 9]$$

$$3 + |x - 2| > 8 - |x - 2| \quad \left[x < -\frac{1}{2} \vee x > \frac{9}{2}\right]$$

Esercizi

Risolvere le seguenti disequazioni prodotto:

$$(x-3)(x+7) < 0 \quad [-7 < x < 3]$$

$$-x(2-x) < 0 \quad [0 < x < 2]$$

$$(3x-6)(x+4) > 0 \quad [x < -4 \vee x > 2]$$

$$-(4-x)(-x-1) > 0 \quad [-1 < x < 4]$$

$$2x(x+1)(3-x) \leq 0 \quad [-1 \leq x \leq 0 \vee x \geq 3]$$

$$-7x\left(x - \frac{8}{3}\right)(2-3x) \geq 0 \quad \left[0 \leq x \leq \frac{2}{3} \vee x \geq \frac{8}{3}\right]$$

$$-4a(a-8)(8+a) > 0 \quad [a < -8 \vee 0 < a < 8]$$

$$x\left(x + \frac{2}{3}\right)\left(\frac{2}{3} - x\right) < 0 \quad \left[-\frac{2}{3} < x < 0 \vee x > \frac{2}{3}\right]$$

$$\left(b + \frac{1}{3}\right)\left(\frac{3}{5} - b\right)\left(b - \frac{2}{7}\right) \leq 0 \quad \left[-\frac{1}{3} \leq b \leq \frac{2}{7} \vee b \geq \frac{3}{5}\right]$$

$$(x-7)\left(2x + \frac{3}{4}\right)\left(\frac{1}{3} - 2x\right) < 0 \quad \left[-\frac{3}{8} < x < \frac{1}{6} \vee x > 7\right]$$

$$-3\left(x + \frac{1}{4}\right)(1-x)\left(\frac{3}{2} - x\right) > 0 \quad \left[x < -\frac{1}{4} \vee 1 < x < \frac{3}{2}\right]$$

Esercizi

Risolvere le seguenti disequazioni di secondo:

$$2x^2 - x - 3 < 0$$

$$\left[-1 < x < \frac{3}{2}\right]$$

$$-x^2 + 3x - 6 > 0$$

[impossibile]

$$2x^2 - 5x + 8 > 0$$

$[\forall x \in \mathbb{R}]$

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

$$\left[x < \frac{1}{5} \vee x > 1\right]$$

$$2x^2 - 5x - 3 > 0$$

$$\left[x < -\frac{1}{2} \vee x > 3\right]$$

$$-6x^2 - 19x + 20 \geq 0$$

$$\left[-4 \leq x \leq \frac{5}{6}\right]$$

$$-3(x^2 - 2x) > 0$$

$$[0 < x < 2]$$

$$-8x^2 + x - 1 \geq 0$$

[impossibile]

$$12 + \frac{1}{5}x^2 < 0$$

[impossibile]

$$-x^2 + 7x - \frac{49}{4} \geq 0$$

$$\left[x = \frac{7}{2}\right]$$

$$x^2 + 2x + 1 > 0$$

$$[x \neq -1]$$

$$-2x^2 - 3 < 0$$

$$[\forall x \in \mathbb{R}]$$

$$2x^2 - \sqrt{3}x + 10 \leq 0$$

[impossibile]

$$4x^2 + 12x + 9 > 0$$

$$\left[x \neq -\frac{3}{2}\right]$$

$$9x^2 - 6x + 1 \leq 0$$

$$\left[x = \frac{1}{3}\right]$$

$$2x^2 + 20x + 50 \geq 0$$

$$[\forall x \in \mathbb{R}]$$

$$-3x^2 - 11x - 10 > 0$$

$$\left[-2 < x < -\frac{5}{3}\right]$$

$$x^2 + 4x + 7 \geq 0$$

$$[\forall x \in \mathbb{R}]$$

$$-x^2 + 25 \geq 0$$

$$[-5 \leq x \leq 5]$$

$$3x^2 + 2^3x + 2^4 < 0$$

[impossibile]

Esercizi

Risolvere le seguenti disequazioni di secondo grado:

$$(1-x)^2 + 2 + (x+4)^2 < x + 2(8-x)$$

$$\left[-3 < x < -\frac{1}{2}\right]$$

$$\frac{5}{2}x(x+1) + \frac{3}{2}\left(-x^2 - \frac{4}{3}x + \frac{1}{24}\right) > 0$$

$$\left[x \neq -\frac{1}{4}\right]$$

$$(2x+3)\left(x + \frac{3}{2}\right) - 7x > 2\left(\frac{1}{4} - \frac{7}{2}x\right)$$

$$[x < -2 \vee x > -1]$$

$$\frac{19}{30} + \frac{x-3}{5} + \frac{2x^2+1}{2} > 2\left(\frac{7x^2-1}{15}\right)$$

$$[\forall x \in \mathbb{R}]$$

$$1 + (3x+1)\left(x + \frac{1}{3}\right) + \frac{1}{3}(14-9x) < 1 - 3x$$

$$[\nexists x \in \mathbb{R}]$$

$$3(x-3)(x+1) + 3(x^2+6x-1) - 2(x^2-11) > 1$$

$$\left[x \neq -\frac{3}{2}\right]$$

$$\frac{7}{3}x(x+3) + \frac{2(x^2+18)}{3} + 5x > x+2$$

$$\left[x < -2 \vee x > -\frac{5}{3}\right]$$

$$x(x^2-3) + x(-3x+2) + 6 > x(x^2-4) + 14$$

$$[\nexists x \in \mathbb{R}]$$

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

$$[\forall x \in \mathbb{R}]$$

Esercizi

Risolvere le seguenti disequazioni fratte:

$$\frac{2}{x+5} > 0$$

$$\frac{6x}{x^2 - 6x} < 0$$

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

$$\frac{5}{x+2} \geq 0$$

$$\frac{x-5}{x^2+10x} > 0$$

$$\frac{x^2 - 6x + 9}{3x^2} \geq 0$$

$$\frac{x^2 - 16}{x^2 - 8x + 16} < 0$$

$$\frac{x^2 - 6x + 9}{x^2 - 9} > 0$$

$$\frac{9x^2 - 30x + 25}{3x - 5} \geq 0$$

$$\frac{(2x+1)(2x-7)}{4x^2 - 12x - 7} > 0$$

$$\frac{(x+1)(2-3x)}{6x^2 - x - 2} > 0$$

$$\frac{(2x-3)(x+7)(3-x)}{x^2 - 9} < 0$$

Esercizi

Risolvere le seguenti disequazioni fratte:

$$\frac{x+3}{5-2x} > 0 \quad \left[-3 < x < \frac{5}{2}\right]$$

$$\frac{1-3x}{x+4} > 0 \quad \left[-4 < x < \frac{1}{3}\right]$$

$$-\frac{2x+1}{7-x} \leq 0 \quad \left[-\frac{1}{2} \leq x < 7\right]$$

$$\frac{-(2-x)-(3+2x)}{1-x} < 0 \quad \left[-5 < x < 1\right]$$

$$\frac{x^2-4}{x} > 0 \quad \left[-2 < x < 0 \vee x > 2\right]$$

$$\frac{2x}{6x^2+x-5} \leq 0 \quad \left[x < -1 \vee 0 \leq x < \frac{5}{6}\right]$$

$$\frac{(5-x)^3}{3-x} < 0 \quad \left[3 < x < 5\right]$$

$$\frac{x^2+4x+4}{12x-4-9x^2} \geq 0 \quad \left[x = -2\right]$$

$$\frac{x(-x+8)-(2x+9)}{x^2-4} \leq 0 \quad \left[x < -2 \vee x > 2\right]$$

$$\frac{x^2-4}{x^2+5x-14} < 0 \quad \left[-7 < x < -2\right]$$

$$\frac{x^2-4x+3}{x^2+x-12} \geq 0 \quad \left[x < -4 \vee x \geq 1 \wedge x \neq 3\right]$$

$$\frac{-x^2+7x-12}{2x^2-7x+3} > 0 \quad \left[\frac{1}{2} < x < 3 \vee 3 < x < 4\right]$$

$$\frac{x^2-2x-8}{x^3+x} \geq 0 \quad \left[-2 \leq x < 0 \vee x \geq 4\right]$$

RISOLVI IN 4 PASSI

1 Scomponi il denominatore nei fattori D_1 e D_2 .

2 Studia il segno del numeratore N e dei fattori D_1 e D_2 .

3 Compila il quadro dei segni ed escludi i valori di x per cui D_1 e D_2 si annullano.

4 Deduci la soluzione.

$$\frac{x^2-8x+16}{(x+1)(2x-11)} < 0 \quad \left[-1 < x < \frac{11}{2} \wedge x \neq 4\right]$$

$$\frac{(3x-4)(x+5)}{x^2+3x-10} \geq 0 \quad \left[x \leq \frac{4}{3} \wedge x \neq -5 \vee x > 2\right]$$

$$\frac{(1-x)^4(x-2)^3}{x(x-3)^2} > 0 \quad \left[x < 0 \vee x > 2, x \neq 3\right]$$

$$\frac{-x^4+x^2}{4x^2-9} > 0 \quad \left[-\frac{3}{2} < x < -1 \vee 1 < x < \frac{3}{2}\right]$$

$$\frac{x^3-3x^2+2x}{x+1} \leq 0 \quad \left[-1 < x \leq 0 \vee 1 \leq x \leq 2\right]$$

Esercizi

Risolvere le seguenti equazioni irrazionali:

$$5 - \sqrt{2-x} = 0 \quad [-23]$$

$$\sqrt{y^2 + 3y - 10} = 2\sqrt{2} \quad [-6; 3]$$

$$\sqrt{\frac{x-1}{2x+1}} = \frac{1}{2} \quad \left[\frac{5}{2}\right]$$

$$\sqrt{3x+4} = 2+x \quad [-1; 0]$$

$$\sqrt[3]{x} = x \quad [-1; 0; 1]$$

$$2 + \sqrt{8-4x} = x \quad [2]$$

$$\sqrt{x+1} - x - 1 = 0 \quad [-1; 0]$$

$$\sqrt[3]{x^3-2} = 1+x \quad [\nexists x \in \mathbb{R}]$$

$$\sqrt{4x+5} = 2x+1 \quad [1]$$

$$\sqrt{6x+3} + x = 4 \quad [1]$$

$$5 - \sqrt{2-x} = 0 \quad [-23]$$

$$\sqrt{y^2 + 3y - 10} = 2\sqrt{2} \quad [-6; 3]$$

$$\sqrt{\frac{x-1}{2x+1}} = \frac{1}{2} \quad \left[\frac{5}{2}\right]$$

$$\sqrt{3x+4} = 2+x \quad [-1; 0]$$

$$\sqrt[3]{x} = x \quad [-1; 0; 1]$$

$$2 + \sqrt{8-4x} = x \quad [2]$$

$$\sqrt{x+1} - x - 1 = 0 \quad [-1; 0]$$

$$\sqrt[3]{x^3-2} = 1+x \quad [\nexists x \in \mathbb{R}]$$

$$\sqrt{4x+5} = 2x+1 \quad [1]$$

$$\sqrt{6x+3} + x = 4 \quad [1]$$

Esercizi

Risolvere le seguenti disequazioni irrazionali:

$$\sqrt{7-x} - 2 \leq 0 \quad [3 \leq x \leq 7]$$

$$\sqrt{4x - x^2} \geq 2 \quad [x = 2]$$

$$\sqrt{x^2 - 16} \leq 3 \quad [-5 \leq x \leq -4 \vee 4 \leq x \leq 5]$$

$$\sqrt{2x^2 + 3x} - \sqrt{2} > 0 \quad \left[x < -2 \vee x > \frac{1}{2}\right]$$

$$\sqrt[3]{x^2 - 1} < 2 \quad [-3 < x < 3]$$

$$\sqrt{3x + 2x^2} > -1 \quad \left[x \leq -\frac{3}{2} \vee x \geq 0\right]$$

$$\frac{\sqrt{x^2 + 6x + 2}}{2x} \leq 0 \quad [x \leq -6]$$

$$\frac{\sqrt{x} - 2}{1 - \sqrt{x+1}} > 0 \quad [0 < x < 4]$$

$$\sqrt{\frac{2-x}{x+1}} \geq \frac{1}{2}$$

$$\sqrt{6-x} < 2$$

$$\sqrt{2x-1} > 5$$

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