

Risolvi le seguenti disequazioni di secondo grado ($\Delta = 0$).

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|--|------------------------|--------------------------------|---------------------------|
| 71 $4x^2 + \frac{1}{4} - 2x \geq 0$ | $\{x \in \mathbb{R}\}$ | 74 $7x(7x - 2) \geq -1$ | $\{x \in \mathbb{R}\}$ |
| 72 $9x^2 - 12x + 4 < 0$ | $\{x \in \mathbb{R}\}$ | 75 $8x(2x + 1) > -1$ | $\{x \neq -\frac{1}{4}\}$ |
| 73 $x^2 + 4 \leq 4x$ | $\{x = 2\}$ | 76 $x^2 + 36 \geq 12x$ | $\{x \in \mathbb{R}\}$ |

L'equazione associata ha $\Delta < 0$

77 ESERCIZIO GUIDA

Risolvi la disequazione numerica intera $5(2x + 3) + 3x(x - 2) + 4x < 2(x^2 - 10) - 2x$.

Sviluppiamo i calcoli e otteniamo:

$$x^2 + 10x + 35 < 0.$$

La regola del segno del trinomio

Calcoliamo il discriminante dell'equazione associata $x^2 + 10x + 35 = 0$:

$$\frac{\Delta}{4} = 25 - 35 = -10.$$

Poiché il coefficiente di x^2 è positivo e $\Delta < 0$, la disequazione non è mai verificata. Scriviamo pertanto:

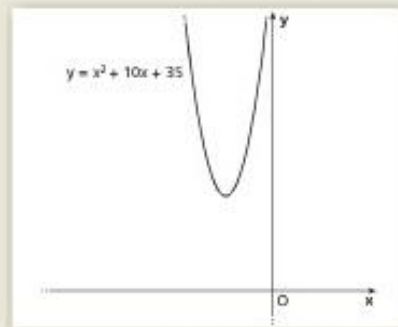
$$\mathbb{R} \in \mathbb{R}.$$

Il metodo grafico della parabola

Associamo la disequazione alla parabola di equazione:

$$y = x^2 + 10x + 35.$$

La parabola ha la concavità rivolta verso l'alto (il coefficiente a è positivo) e non interseca l'asse x . I punti della parabola hanno tutti ordinata positiva, per cui la disequazione non ha soluzioni.



Risolvi le seguenti disequazioni di secondo grado ($\Delta < 0$).

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|---|------------------------|---------------------------------|------------------------|
| 78 $3x^2 + 2x + 5 > 0$ | $\{x \in \mathbb{R}\}$ | 81 $25x^2 - 10x \geq -4$ | $\{x \in \mathbb{R}\}$ |
| 79 $\frac{1}{9}x^2 + x + 9 \leq 0$ | $\{x \in \mathbb{R}\}$ | 82 $-4x^2 + 8x - 9 < 0$ | $\{x \in \mathbb{R}\}$ |
| 80 $x(2 - x) < 6$ | $\{x \in \mathbb{R}\}$ | 83 $2(x^2 + 4) < x$ | $\{x \in \mathbb{R}\}$ |

RIEPILOGO Le disequazioni di 2° grado numeriche intere

Risolvi le seguenti disequazioni.

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|-------------------------------------|-----------------------------------|-------------------------------|-------------------------------|
| 84 $x^2 - 1 > \frac{15}{4}x$ | $\{x < -\frac{1}{4} \vee x > 4\}$ | 87 $-x^2 + 9 \leq 0$ | $\{x \leq -3 \vee x \geq 3\}$ |
| 85 $4x^2 + 11x - 3 \leq 0$ | $[-3 \leq x \leq \frac{1}{4}]$ | 88 $4x^2 + 4x + 9 < 0$ | $\{x \in \mathbb{R}\}$ |
| 86 $x^2 - 4x - 12 \geq 0$ | $\{x \leq -2 \vee x \geq 6\}$ | 89 $-x^2 + 8x \geq 0$ | $\{0 \leq x \leq 8\}$ |

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|--|--|--|--|
| 90 $-x^2 + 1 > 0$ | $\{-1 < x < 1\}$ | 101 $(x + 3)^2 + 12(2 - x) > 3(3 - 4x)$ | $\{x \in \mathbb{R}\}$ |
| 91 $-\frac{1}{4}x^2 \leq 0$ | $\{x \in \mathbb{R}\}$ | 102 $(x + 1)^2 + (2x - 1) > \frac{x - 5}{2}$ | $\{x < -\frac{5}{2} \vee x > -1\}$ |
| 92 $x^2 + 2x + 9 \geq 0$ | $\{x \in \mathbb{R}\}$ | 103 $(x - \frac{7}{2})^2 + 2(8 + x) < \frac{1}{4}(49 + 8x)$ | $\{x \in \mathbb{R}\}$ |
| 93 $3x(x - 1) + (x^2 + 1) < 0$ | $\{x \in \mathbb{R}\}$ | 104 $2x(x + 1) - (x^2 + 1) < 2x^2$ | $\{x \neq 1\}$ |
| 94 $-x^2 + 14x - 49 < 0$ | $\{x \neq 7\}$ | 105 $4(x^2 - 1) + (x + 1)(x - 3) < 0$ | $\{-1 < x < \frac{7}{5}\}$ |
| 95 $-2x^2 + 7x - 3 < 0$ | $\{x > 3 \vee x < \frac{1}{2}\}$ | 106 $\frac{x(x + 3)}{3} + \frac{x(2x - 1)}{2} > -\frac{3}{2}$ | $\{x \in \mathbb{R}\}$ |
| 96 $2(x - 1)(x + 3) \geq 0$ | $\{x \leq -3 \vee x \geq 1\}$ | 107 $(1 - x) + (x + 4)^2 < x + 2(8 - x)$ | $[-\sqrt{15} - 4 < x < \sqrt{15} - 4]$ |
| 97 $x^2 - 2\sqrt{2}x + 2 \leq 0$ | $\{x = \sqrt{2}\}$ | 108 $\frac{1}{2}(x - 1) + 5(\frac{1}{2}x - 7) > -\frac{1}{2}x^2$ | $\{x > 4\sqrt{5} - 3 \vee x < -4\sqrt{5} - 3\}$ |
| 98 $2(x^2 + 1) < 5x$ | $\{\frac{1}{2} < x < 2\}$ | 109 $8(x^2 + 2 - x) < x(16 - x)$ | $\{x \in \mathbb{R}\}$ |
| 99 $3(\frac{2}{3} - x)(x + 4) \geq 0$ | $[-4 \leq x \leq \frac{2}{3}]$ | 110 $\frac{5}{2}x(x + 1) + \frac{3}{2}(-x^2 - \frac{4}{3}x + \frac{1}{24}) > 0$ | $\{x \neq -\frac{1}{4}\}$ |
| 100 $16(x^2 + 1) < 40x + 7$ | $\{\frac{1}{4} < x < \frac{9}{4}\}$ | 111 $(2x + 3)(x + \frac{3}{2}) - 7x > 2(\frac{1}{4} - \frac{7}{2}x)$ | $\{x < -2 \vee x > -1\}$ |
| 110 $\frac{5}{2}x(x + 1) + \frac{3}{2}(-x^2 - \frac{4}{3}x + \frac{1}{24}) > 0$ | $\{x \neq -\frac{1}{4}\}$ | 112 $(x + 1)^3 > x(x^2 - 2) + (x - 2)(x + 1)$ | $\{x < \frac{-3 - \sqrt{5}}{2} \vee x > \frac{-3 + \sqrt{5}}{2}\}$ |
| 111 $(2x + 3)(x + \frac{3}{2}) - 7x > 2(\frac{1}{4} - \frac{7}{2}x)$ | $\{x < -2 \vee x > -1\}$ | 113 $1 + (3x + 1)(x + \frac{1}{3}) + \frac{1}{3}(14 - 9x) < 1 - 3x$ | $\{x \in \mathbb{R}\}$ |
| 112 $(x + 1)^3 > x(x^2 - 2) + (x - 2)(x + 1)$ | $\{x < \frac{-3 - \sqrt{5}}{2} \vee x > \frac{-3 + \sqrt{5}}{2}\}$ | 114 $3(x - 3)(x + 1) + 3(x^2 + 6x - 1) - 2(x^2 - 11) > 1$ | $\{x \neq -\frac{3}{2}\}$ |
| 113 $1 + (3x + 1)(x + \frac{1}{3}) + \frac{1}{3}(14 - 9x) < 1 - 3x$ | $\{x \in \mathbb{R}\}$ | 115 $\frac{7}{3}x(x + 3) + \frac{2(x^2 + 18)}{3} + 5x > x + 2$ | $\{x < -2 \vee x > -\frac{5}{3}\}$ |
| 114 $3(x - 3)(x + 1) + 3(x^2 + 6x - 1) - 2(x^2 - 11) > 1$ | $\{x \neq -\frac{3}{2}\}$ | 116 $x(x + \frac{11}{7}) + (2 - x)(4 + x^2 + 2x) + x(x^2 + \frac{3}{7}) + 1 > 0$ | $\{x \in \mathbb{R}\}$ |
| 115 $\frac{7}{3}x(x + 3) + \frac{2(x^2 + 18)}{3} + 5x > x + 2$ | $\{x < -2 \vee x > -\frac{5}{3}\}$ | 117 $x(x + 2\sqrt{2}) + 2(\sqrt{2}x - 6) < 3\sqrt{2}x$ | $[-3\sqrt{2} < x < 2\sqrt{2}]$ |
| 116 $x(x + \frac{11}{7}) + (2 - x)(4 + x^2 + 2x) + x(x^2 + \frac{3}{7}) + 1 > 0$ | $\{x \in \mathbb{R}\}$ | 118 $\frac{2 - \sqrt{3}x}{\sqrt{2}} + \frac{x^2 - \sqrt{2}}{\sqrt{3}} + \frac{1 + x}{\sqrt{6}} > 0$ | $\{x \in \mathbb{R}\}$ |
| 117 $x(x + 2\sqrt{2}) + 2(\sqrt{2}x - 6) < 3\sqrt{2}x$ | $[-3\sqrt{2} < x < 2\sqrt{2}]$ | 119 $(\frac{1}{2}x - 1)^2 + (x - 1)(x + 1) \geq \frac{1}{4}x^2 - \frac{1}{4}$ | $\{x \in \mathbb{R}\}$ |
| 118 $\frac{2 - \sqrt{3}x}{\sqrt{2}} + \frac{x^2 - \sqrt{2}}{\sqrt{3}} + \frac{1 + x}{\sqrt{6}} > 0$ | $\{x \in \mathbb{R}\}$ | 120 $(x + \frac{1}{2})^2 + (1 + x)(1 - x) < (\frac{1}{2} - x)(\frac{1}{2} + x)$ | $\{x \in \mathbb{R}\}$ |
| 119 $(\frac{1}{2}x - 1)^2 + (x - 1)(x + 1) \geq \frac{1}{4}x^2 - \frac{1}{4}$ | $\{x \in \mathbb{R}\}$ | 121 $\sqrt{2}x(1 + \sqrt{2}x - \frac{\sqrt{6}}{2}) + x > \frac{\sqrt{5}}{2} + \sqrt{2}x$ | $\{x < -\frac{1}{2} \vee x > \frac{\sqrt{3}}{2}\}$ |
| 120 $(x + \frac{1}{2})^2 + (1 + x)(1 - x) < (\frac{1}{2} - x)(\frac{1}{2} + x)$ | $\{x \in \mathbb{R}\}$ | 122 $\frac{1}{7}(x + 21)^2 + 5x(\frac{x}{7} + \frac{1}{3}) + \frac{13}{4} > \frac{3 - 40x}{12}$ | $\{x \in \mathbb{R}\}$ |