# Disequazioni di grado superiore al secondo

PASSED

| disequazioni monomie | | |
|---|---|---|
| 1 | $\frac{3}{2}x^4 > 0$ | $x < 0 \vee x > 0$ |
| 2 | $-5x^6 > 0$ | $\emptyset$ |
| 3 | $\frac{7}{5}x^5 \leq 0$ | $x \leq 0$ |
| 4 | $7x^3 > 0$ | $x > 0$ |
| 5 | $2x^4 \leq 0$ | $x = 0$ |
| 6 | $11x^{10} \geq 0$ | $R$ |
| 7 | $-5x^6 < 0$ | $x \neq 0$ |
| 8 | $-\frac{4}{3}x^7 > 0$ | $x < 0$ |
| 9 | $\frac{1}{2}x^5 \geq 0$ | $x \geq 0$ |
| 10 | $-\frac{13}{x^{-13}} \geq 0$ | $x \leq 0$ |

| disequazioni binomie | | |
|---|---|---|
| 11 | $x^4 + 4 < 0$ | $\emptyset$ |
| 12 | $2x^4 + \sqrt{3} > 0$ | $R$ |
| 13 | $x^4 + 3 \geq 0$ | $R$ |
| 14 | $x^3 + 1 \leq 0$ | $x \leq -1$ |
| 15 | $x^6 + 1 \geq 0$ | $R$ |
| 16 | $x^4 - 81 < 0$ | $-3 < x < 3$ |

| | | |
|---|---|---|
| 17 | $4x^8 + 1 \geq 0$ | $R$ |
| 18 | $16x^4 - 1 \geq 0$ | $x \leq -\frac{1}{2} \vee x \geq \frac{1}{2}$ |
| 19 | $27x^6 + 5 > 0$ | $R$ |
| 20 | $x^5 - 32 \leq 0$ | $x \leq 2$ |
| 21 | $x^6 + 1 < 0$ | $\emptyset$ |
| 22 | $x^4 - 4 \leq 0$ | $-\sqrt{2} \leq x \leq \sqrt{2}$ |
| 23 | $x^8 - 2 \leq 0$ | $-\sqrt[8]{2} \leq x \leq \sqrt[8]{2}$ |
| 24 | $x^8 + 2 \geq 0$ | $R$ |
| 25 | $x^{11} - 121 \leq 0$ | $x \leq \sqrt[11]{121}$ |
| 26 | $x^{11} + 121 > 0$ | $x > -\sqrt[11]{121}$ |

## disequazioni biquadratiche

| | | |
|---|---|---|
| 27 | $x^4 + x^2 + 1 > 0$ | $R$ |
| 28 | $4x^4 - 2x^2 - 2 < 0$ | $-1 < x < 1$ |
| 29 | $8x^4 - 11x^2 + 3 > 0$ | $x < -1 \vee -\frac{\sqrt{6}}{4} < x < \frac{\sqrt{6}}{4} \vee x > 1$ |
| 30 | $x^4 - 5x^2 - 6 > 0$ | $x < -\sqrt{6} \vee x > \sqrt{6}$ |
| 31 | $x^4 - 5x^2 + 4 \geq 0$ | $x \leq -2 \vee -1 \leq x \leq 1 \vee x \geq 2$ |
| 32 | $x^4 - 8x^2 + 16 > 0$ | $R - \{-2; 2\}$ |

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|---|---|---|
| 33 | $x^4 - 7x^2 + 18 > 0$ | $R$ |
| 34 | $x^4 - 7x^2 + 6 \geq 0$ | $x \leq -\sqrt{6} \ \vee \ -1 \leq x \leq 1 \ \vee \ x \geq \sqrt{6}$ |
| 35 | $x^4 - 26x^2 + 25 > 0$ | $x < -5 \ \vee \ -1 < x < 1 \ \vee \ x > 5$ |
| 36 | $9x^4 + 46x^2 + 5 < 0$ | $\emptyset$ |
| 37 | $x^4 - 2x^2 + 1 \leq 0$ | $x = \pm 1$ |
| 38 | $x^4 - 3x^2 - 4 \geq 0$ | $x \leq -2 \ \vee \ x \geq 2$ |
| 39 | $x^4 - x^2 - 2 < 0$ | $-\sqrt{2} < x < \sqrt{2}$ |
| 40 | $4x^4 - 17x^2 + 18 \geq 0$ | $x \leq -\frac{3}{2} \ \vee \ -\sqrt{2} \leq x \leq \sqrt{2} \ \vee \ x \geq \frac{3}{2}$ |
| 41 | $2x^4 - 31x^2 - 16 < 0$ | $-4 < x < 4$ |
| 42 | $5x^4 - 16x^2 + 3 > 0$ | $x < -\sqrt{3} \ \vee \ -\frac{\sqrt{5}}{5} < x < \frac{\sqrt{5}}{5} \ \vee \ x > \sqrt{3}$ |
| 43 | $10x^4 + 11x^2 + 3 < 0$ | $\emptyset$ |
| 44 | $x^4 - 5x^2 + 4 < 0$ | $-2 < x < -1 \ \vee \ 1 < x < 2$ |
| 45 | $x^4 - 4x^2 + 3 > 0$ | $x < -\sqrt{3} \ \vee \ -1 < x < 1 \ \vee \ x > \sqrt{3}$ |
| 46 | $x^4 - 8x^2 - 9 > 0$ | $x < -3 \ \vee \ x > 3$ |
| 47 | $x^4 - 9x^2 + 20 \leq 0$ | $-\sqrt{5} \leq x \leq -2 \ \vee \ 2 \leq x \leq \sqrt{5}$ |
| 48 | $x^4 + x^2 + 1 < 0$ | $\emptyset$ |

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|---|---|---|
| 49 | $x^4 - 12x^2 + 27 \geq 0$ | $x \leq -3 \vee -\sqrt{3} \leq x \leq \sqrt{3} \vee x \geq 3$ |
| 50 | $5x^4 + 3x^2 + \sqrt{2} > 0$ | $R$ |
| 51 | $x^4 - 14x^2 - 32 < 0$ | $-4 < x < 4$ |
| 52 | $x^4 + 2x^2 - 3 \leq 0$ | $-1 \leq x \leq 1$ |
| 53 | $4x^4 - 5x^2 + 1 \geq 0$ | $x \leq -1 \vee -\frac{1}{2} \leq x \leq \frac{1}{2} \vee x \geq 1$ |
| 54 | $4x^6 + 8x^3 + 4 > 0$ | $R - \{-1\}$ |
| 55 | $2x^8 + x^4 - 3 > 0$ | $x < -1 \vee x > 1$ |
| 56 | $x^6 - 7x^3 - 8 < 0$ | $-1 < x < 2$ |
| 57 | $x^6 - 5x^3 + 6 > 0$ | $x < \sqrt[3]{2} \vee x > \sqrt[3]{3}$ |
| 58 | $x^6 + 2x^3 - 15 < 0$ | $-\sqrt[3]{5} < x < \sqrt[3]{3}$ |
| 59 | $(x^2 + 1)^2 - 4(2 - x^2) \leq 0$ | $-1 \leq x \leq 1$ |
| 60 | $(x^2 - 1)^2 + 4x^2(1 - x^2) \leq 0$ | $x \leq -1 \vee x \geq 1$ |
| 61 | $(x^2 + 2)^2 - (2 + 7x^2) > 0$ | $x < -\sqrt{2} \vee -1 < x < 1 \vee x > \sqrt{2}$ |
| 62 | $(x^2 - 1)(16x^2 - 1) < 0$ | $-1 < x < -\frac{1}{4} \vee \frac{1}{4} < x < 1$ |
| 63 | $x^4 + 2a^2x^2 - 3a^4 > 0$ | $x < -\lvert a \rvert \vee x > \lvert a \rvert$ |
| 64 | $(x^2 - 1)^6 + 3(x^2 - 1)^3 - 40 \leq 0$ | $-\sqrt{1 + \sqrt[3]{5}} \leq x \leq \sqrt{1 + \sqrt[3]{5}}$ |

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## disequazioni risolvibili tramite scomposizione

| | | |
|---|---|---|
| 65 | $x^4 - x^2 > 0$ | $x < -1 \vee x > 1$ |
| 66 | $x^4 - 5x^2 \geq 0$ | $x = 0 \vee x \leq -\sqrt{5} \vee x \geq \sqrt{5}$ |
| 67 | $x^2 - x^4 > 0$ | $-1 < x < 0 \vee 0 < x < 1$ |
| 68 | $x^3 - 5x^2 + 6x < 0$ | $x < 0 \vee 2 < x < 3$ |
| 69 | $x^3 - 2x^2 - x + 2 \leq 0$ | $x \leq -1 \vee 1 \leq x \leq 2$ |
| 70 | $2x^3 - 11x^2 + 17x - 6 \geq 0$ | $\frac{1}{2} \leq x \leq 2 \vee x \geq 3$ |
| 71 | $x^2(x^2 - 1) \geq 0$ | $x \leq -1 \vee x \geq 1 \vee x = 0$ |
| 72 | $x^3 + x^2 - 10x + 8 < 0$ | $x < -4 \vee 1 < x < 2$ |
| 73 | $2x^5 - 2x^4 - x^3 + x^2 - 21x + 21 < 0$ | $x < -\frac{\sqrt{14}}{2} \vee 1 < x < \frac{\sqrt{14}}{2}$ |
| 74 | $x(x^2 - 11) < 7x(1 - x)$ | $x < -9 \vee 0 < x < 2$ |
| 75 | $3x^4 - x^3 + 3x - 1 < 0$ | $-1 < x < \frac{1}{3}$ |
| 76 | $x^4 - x^3 + x^2 > 0$ | $\mathrm{R} - \{0\}$ |
| 77 | $10x^3 + 5x^2 - 2x - 1 > 0$ | $-\frac{1}{2} < x < -\frac{\sqrt{5}}{5} \vee x > \frac{\sqrt{5}}{5}$ |
| 78 | $8x^3 + 2x^2 - 24x - 6 > 0$ | $-\sqrt{3} < x < -\frac{1}{4} \vee x > \sqrt{3}$ |
| 79 | $x^4 - x^3 - x^2 \leq 0$ | $\frac{1 - \sqrt{5}}{2} \leq x \leq \frac{1 + \sqrt{5}}{2}$ |
| 80 | $x^3 - x^2 - 2x + 2 > 0$ | $-\sqrt{2} < x < 1 \vee x > \sqrt{2}$ |

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|---|---|---|
| 81 | $(2x^2-3)(x^2+1)+x^2(1-x^2)<0$ | $-\sqrt[4]{3}<x<\sqrt[4]{3}$ |
| 82 | $x^3-2x-21<0$ | $x<3$ |
| 83 | $3x^3-12x^2-12x+3>0$ | $-1<x<\frac{5-\sqrt{21}}{2} \vee x>\frac{5-\sqrt{21}}{2}$ |
| 84 | $-5x^3-38x^2-5x-38<0$ | $x>-\frac{38}{5}$ |
| 85 | $4x^3-13x^2-13x+4\geq 0$ | $-1\leq x\leq\frac{1}{4} \vee x\geq 4$ |
| 86 | $(x^3+x^2+x+1)(x^3-27)<0$ | $-1<x<3$ |
| 87 | $[x(x+1)-3x]x(x+2)<4-x^2$ | $-2<x<2$ |
| 88 | $x^5-2x^4+x^3-2x^2-2x+4\leq 0$ | $x\leq -1 \vee 1\leq x\leq 2$ |
| 89 | $8x^3-(x^2+7)\geq 0$ | $x\geq 1$ |
| 90 | $2x^3-5x^2+8x-20<0$ | $x<\frac{5}{2}$ |
| 91 | $2x(x^2+1)+x^3(x-1)-(3x+1)>0$ | $x<-1 \vee x>1$ |
| 92 | $5x^2+7x^4\leq 0$ | $x=0$ |
| 93 | $x^4-5x^3-x+5<0$ | $1<x<5$ |
| 94 | $x^3(x^2-1)-2x(x^2+14)<0$ | $x<-\sqrt{7} \vee 0<x<\sqrt{7}$ |
| 95 | $x^3+4x^2+x<6$ | $x<-3 \vee -2<x<1$ |
| 96 | $x^3+2x^2-9x-18<0$ | $x<-3 \vee -2<x<3$ |

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|---|---|---|
| 97 | $(x^2-3x-4)(x^2-25)<0$ | $-5<x<-1 \vee 4<x<5$ |
| 98 | $x^3+x^2-4x-4<0$ | $x<-2 \vee -1<x<2$ |
| 99 | $2x^4-5x^3+5x-2<0$ | $-1<x<\frac{1}{2} \vee 1<x<2$ |
| 100 | $x^3>6x^2-8x$ | $0<x<2 \vee x>4$ |
| 101 | $x^3>x^2+2x$ | $-1<x<0 \vee x>2$ |
| 102 | $2x^3+3x^2-2x-3>0$ | $-\frac{3}{2}<x<-1 \vee x>1$ |
| 103 | $x(x-1)(x+2)>0$ | $-2<x<0 \vee x>1$ |
| 104 | $x(x-1)^2(x+2)<0$ | $-2<x<0$ |
| 105 | $(x-1)(x^2+4x)(5+2x)<0$ | $-4<x<-\frac{5}{2} \vee 0<x<1$ |
| 106 | $x^4-3x^3+2x^2\leq 0$ | $x=0 \vee 1\leq x\leq 2$ |
| 107 | $x^2(x^2-9)>0$ | $x<-3 \vee x>3$ |
| 108 | $x^2(3x^2-4)\leq 0$ | $-\frac{2}{3}\sqrt{3}\leq x\leq \frac{2}{3}\sqrt{3}$ |
| 109 | $(2x^2-1)(x^2-9)>0$ | $x<-3 \vee -\frac{\sqrt{2}}{2}<x<\frac{\sqrt{2}}{2} \vee x>3$ |
| 110 | $x^3+x^2-3x+1>0$ | $-\sqrt{2}-1<x<\sqrt{2}-1 \vee x>1$ |
| 111 | $2x^4-7x^3+4x^2+7x-6<0$ | $-1<x<1 \vee \frac{3}{2}<x<2$ |
| 112 | $(x^2-3)(x-2)(x^2+1)>0$ | $-\sqrt{3}<x<\sqrt{3} \vee x>2$ |

| | | |
|---|---|---|
| 113 | $(x^2-3x+4)(x+5)(x^2-2)>0$ | $-5<x<-\sqrt{2} \vee x>\sqrt{2}$ |
| 114 | $x^5+2x^4-21x^3-24x^2+38x+40>0$ | $-5<x<-\sqrt{2} \vee -1<x<\sqrt{2} \vee x>4$ |
| 115 | $3x^4-7x^3-13x^2+35x-10<0$ | $-\sqrt{5}<x<\frac{1}{3} \vee 2<x<\sqrt{5}$ |
| 116 | $x^6-5x^5+6x^4+4x^3-24x^2+16x+32\leq 0$ | $1-\sqrt{5}\leq x\leq -1 \vee 2\leq x\leq 1+\sqrt{5}$ |
| 117 | $x^5-2x^4+5x^3+5x^2-2x+1>0$ | $x>-1$ |
| 118 | $(x^2-4)(x+1)>0$ | $-2<x<-1 \vee x>2$ |
| 119 | $(x-2)(2x-1)(x+3)>0$ | $-3<x<\frac{1}{2} \vee x>2$ |
| 120 | $(x^2+1)(x^2-4)\geq 0$ | $x\leq -2 \vee x\geq 2$ |
| 121 | $(2x^2+3)(x^2-2)\leq 0$ | $-\sqrt{2}\leq x\leq \sqrt{2}$ |

## disequazioni frazionarie

| | | |
|---|---|---|
| 122 | $\frac{x^4}{x^3-8}>0$ | $x>2$ |
| 123 | $\frac{x^3(x-1)^3}{x+3}\geq 0$ | $-3<x\leq 0 \vee x\geq 1$ |
| 124 | $\frac{x^2+4x+4}{12x-4-9x^2}\geq 0$ | $x=-2$ |
| 125 | $\frac{x^2-4}{x^2+5x-14}<0$ | $-7<x<-2$ |
| 126 | $\frac{x^4-13x^2+36}{x^2-1}>0$ | $x<-3 \vee -2<x<-1 \vee 1<x<2 \vee x>3$ |
| 127 | $\frac{x^4+x^2-2}{x^4-3x^2-4}>0$ | $x<-2 \vee -1<x<1 \vee x>2$ |

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|---|---|---|
| 128 | $\frac{x^2-4}{x^3-8x^2+19x-12}<0$ | $x<-2 \vee 1<x<2 \vee 3<x<4$ |
| 129 | $\frac{x^4-4x^2+3}{x^3-8}>0$ | $-\sqrt{2}<x<-1 \vee 1<x<\sqrt{3} \vee x>2$ |
| 130 | $\frac{2x^4-3x^2+1}{x^4-2x^2+1}\leq 0$ | $-1<x\leq-\frac{\sqrt{2}}{2} \vee \frac{\sqrt{2}}{2}\leq x<1$ |
| 131 | $\frac{x-1}{x+1}\geq\frac{x+1}{x-1}$ | $x<-1 \vee 0\leq x<1$ |
| 132 | $\frac{x+3}{x-2}<\frac{x-2}{x+3}$ | $x<-3 \vee -\frac{1}{2}<x<2$ |
| 133 | $\frac{x^3+x^2+1}{x^3-1}\leq 1$ | $x<1$ |
| 134 | $\frac{1}{x-1}\geq\frac{x+1}{x^2-1}$ | $\mathrm{R}-\{-1,+1\}$ |
| 135 | $\frac{2(x+1)^2+1}{x^3-1}>\frac{2}{x-1}-\frac{x}{x^2+x+1}$ | $x>1$ |
| 136 | $\frac{(x^2-2)(1+x^2)}{3(2x^2-1)}<\frac{(x^2+1)}{(1-2x^2)}$ | $-\frac{\sqrt{2}}{2}<x<\frac{\sqrt{2}}{2}$ |
| 137 | $\frac{5}{x+1}<\frac{2x^2-3x+1}{x^3+1}+\frac{1}{x^2-x+1}$ | $x<-1$ |

## disequazioni di riepilogo

| | | |
|---|---|---|
| 138 | $(x^3-8)(x-3)(x^4-2)>0$ | $x<-\sqrt[4]{2} \vee \sqrt[4]{2}<x<2 \vee x>3$ |
| 139 | $3x^{10}<0$ | $\emptyset$ |
| 140 | $x^4-10x^3+28x^2-15x-18>0$ | $x<\frac{5-\sqrt{37}}{2} \vee 2<x<3 \vee x>\frac{5+\sqrt{37}}{2}$ |
| 141 | $\frac{x^4+4x^2}{1-27x^3}\leq 0$ | $x>\frac{1}{3} \vee x=0$ |
| 142 | $(x^4-25x^2+144)(x^2-3)<0$ | $-4<x<-3 \vee -\sqrt{3}<x<\sqrt{3} \vee 3<x<4$ |

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| | | |
|---|---|---|
| 143 | $x^3 - 5x^2 + 5x - 1 > 0$ | $2-\sqrt{3} < x < 1 \ \vee \ x > 2+\sqrt{3}$ |
| 144 | $5x^3 - 2x^2 - 5x + 2 < 0$ | $x < -1 \ \vee \ \frac{2}{5} < x < 1$ |
| 145 | $x^3 - 8 \geq 0$ | $x \geq 2$ |
| 146 | $10x^4 - 11x^2 + 3 \geq 0$ | $x \leq -\frac{\sqrt{15}}{5} \ \vee \ -\frac{\sqrt{2}}{2} \leq x \leq \frac{\sqrt{2}}{2} \ \vee \ x \geq \frac{\sqrt{15}}{5}$ |
| 147 | $2x^8 - 5x^4 + 2 > 0$ | $x < -\sqrt[4]{2} \ \vee \ -\frac{\sqrt[4]{8}}{2} < x < \frac{\sqrt[4]{8}}{2} \ \vee \ x > \sqrt[4]{2}$ |
| 148 | $\frac{4x^4 - 13x^2 - 75}{x^4 - 5x^2 + 4} \geq 0$ | $x \leq -\frac{5}{2} \vee -2 < x < -1 \vee 1 < x < 2 \vee x \geq \frac{5}{2}$ |
| 149 | $(x^2 - 3)(x^2 - 2) < 0$ | $-\sqrt{3} < x < -\sqrt{2} \ \vee \ \sqrt{2} < x < \sqrt{3}$ |
| 150 | $\frac{x^3(x+1)^2}{x+3} \geq 0$ | $x < -3 \ \vee \ x \geq 0 \ \vee \ x = -1$ |
| 151 | $x^2(-x^2 - 2x + 35) \leq 0$ | $x \leq -7 \ \vee \ x \geq 5 \ \ x = 0$ |
| 152 | $\frac{1}{x} < \frac{x-1}{x^2+x+1}$ | $-\frac{1}{2} < x < 0$ |
| 153 | $(x^4 + 3x^2 + 2)(x^2 - 4) < 0$ | $-2 < x < 2$ |
| 154 | $(x-1)^4(2x-1)(x-3)^3(2+x)^2 < 0$ | $\frac{1}{2} < x < 3 \ \wedge \ x \neq 1$ |
| 155 | $x^4 - 17x^2 + 16 \geq 0$ | $x \leq -4 \ \vee \ -1 \leq x \leq 1 \ \vee \ x \geq 4$ |
| 156 | $(x^4 - 16)(27 - x^3) < 0$ | $-2 < x < 2 \ \vee \ x > 3$ |
| 157 | $x^4 - 4x^3 + 6x^2 - 4x + 1 \leq 0$ | $x = 1$ |
| 158 | $x^4 - 16a^4 \geq 0$ | $x \leq -2a \ \vee \ x \geq 2a$ |