

B5. Equazioni di primo grado - Esercizi

EQUAZIONI INTERE

1)	$2(x+5)-x(3)^2=3(x+3)+1+x$	[0]
2)	$5(x-3)-2(1-x)+3x+6=10(x-1)$	[impossibile]
3)	$3(2-6x)=9(3-2x)-21$	[indeterminata]
4)	$3(x-2)-5x=9(x-1)-3(3-x)-2$	[1]
5)	$x(x-1)=x(x+1)+2(x+4)$	[-2]
6)	$x-2+3x+5x+5-6x=8-2x+4x-2+x-1$	[impossibile]
7)	$2(x+1)+5(x+2)=3(x+3)+4(x+1)-x$	[1]
8)	$2(x-1)+3(x-2)=4(x-3)+2(x+2)$	[0]
9)	$2-(x-3)-2(5-x)=7$	[12]
10)	$(x-1)^2=(x+2)^2$	[-1/2]
11)	$(2-x)+3(x-1)-(x-2)=x-1$	[impossibile]
12)	$3x-5(x+6)+15-x(2+3)=2(1-2x)-17(x+1)$	[0]
13)	$x-2(x+3)+x(3-1)=2(x-2)-(x+2)$	[indeterminata]
14)	$(2x-1)(2x+1)=(x-4)^2-3(2-x)(2+x)$	[5/8]
15)	$(3x-2)^2=(5x+1)^2-(4x+3)^2$	[-6]
16)	$(3x-1)^2+2(5+x)^2=10(x+2)(x-2)-x(6-x)+20x$	[impossibile]
17)	$(4-3x)^2-(x+3)(6x-5)=3(x-6)^2-(2+x)$	[impossibile]
18)	$x(x-1)-2x(x+1)=5(3-x)-x(x+2)-15$	[0]
19)	$(2x-1)^2-3x(x+2)=(2x-1)(2x+1)+(x+1)(2-3x)$	[0]
20)	$(2x-1)(4x^2+2x+1)-(2x+1)^3=(4x-3)(4-3x)$	[10/31]
21)	$(x+1)^2-(x-1)^2=(x+3)^2-(x+2)(x-2)$	[-13/2]
22)	$(3-5x)^2-(3x-5)^2=(4x-4)(4x+4)$	[indeterminata]
23)	$(x+1)(x-1)-(x+2)(x-2)=3(x-1)$	[2]
24)	$(1-2x)(3x+1)-3x^2=a-(3x+1)(3x-1)$	[a]
25)	$(x+2)(x^2-2x+4)-(x+2)^3=6(1-x)(x-3)$	[1/2]
26)	$(x-13)^2-(x-12)^2-x(x+8)=(x-5)^2-2x^2$	[indeterminata]
27)	$x(x-5)-(x+1)(x-3)=x(x-1)-(x-1)(x+3)$	[indeterminata]
28)	$(x-2)(3x+1)-(x-1)(3-x)=(2x+1)^2$	[0]
29)	$x-(2x+1)^2=(x-5)(x+5)-5(x-3)(x+3)-3x$	[impossibile]
30)	$(2x-1)(2x+3)-(2x+5)^2=4$	[-2]
31)	$(3-2x)(3+2x)=(2-3x)(2+3x)+5(x-2)^2-10(3-2x)$	[impossibile]
32)	$2(x-1)^2+3(x+1)^2=4(x^2+1)+x(x+1)+1$	[0]
33)	$(3x-2)^2-(2x-3)^2=5(x+1)(x-1)$	[indeterminata]
34)	$(2-3x)(x+1)(x-1)=(1-x)^3-2(x+1)(x^2-x+1)-x(x-6)$	[impossibile]
35)	$(x-1)(x^3+x^2+x+1)-(x^2+1)(x-1)(x+1)=0$	[indeterminata]
36)	$x(x-2)(x+3)=x(x-1)(x+2)-4$	[1]
37)	$(x-2)(x+2)(x-3)=x(x-5)(x+2)$	[-2]
38)	$(x-1)(x-2)(x+2)-(x-1)^3=(2x-1)(x-5)$	[0]
39)	$(2x+1)^3-10x^2+11x=(x-2)(4x+3)(2x-1)+8x(2x+3)$	[impossibile]
40)	$x(x+2)(x-2)-3x(x+2)=x(x+3)(x-3)-x(1+3x)$	[indeterminata]
41)	$2(x-3)(5-x)=(x-1)(1-2x)$	[29/13]
42)	$(x+1)^2-(x-1)^2=(x+2)^2-(x+2)(x-2)-8$	[indeterminata]
43)	$(x^2-2)(x+3)-(2x+3)^2=(x-2)^3-(5x+1)(7-x)$	[0]
44)	$(x+1)^3-(x-1)^3=(2x-1)(3x+1)+x$	[impossibile]
45)	$(1-2x)^2-(x-2)^2=3(x+1)(x-1)$	[indeterminata]
46)	$(2x-3)^3-(2-3x)^3=35(x-1)(x^2+x+1)+90x(1-x)$	[indeterminata]
47)	$6(1-x)(3-x)=(2x+3)(3x-2)-5$	[1]
48)	$(2-3x)(3x+5)-(5-4x)(2x+1)=6-x(x+14)$	[-1]
49)	$(x+1)^2=(x-1)^2$	[0]
50)	$(x+1)^2-(x-1)^2=(x+2)^2-(x-2)^2-4(x-1)$	[impossibile]
51)	$(x-3)^3-(x^2+3x+5)(x-2)=(2-5x)(2x-5)$	[-7]
52)	$(2-x)(2+x)(4+x^2)+(x^2+5)(x^2-3)=(x+6)(2x-5)$	[31/7]
53)	$12(\sqrt{2-x})(\sqrt{2+x})=(x-2)^3-(x+2)^3+40$	[indeterminata]

EQUAZIONI INTERE A COEFFICIENTI FRAZIONARI

54)	$\frac{x-1}{2} - \frac{2+x}{4} = \frac{x-6}{6}$	[0]
55)	$\frac{7+8x}{8} - \frac{2x-3}{4} = \frac{x+2}{2}$	[imp]
56)	$\frac{1}{2}(x+1) + \frac{1}{3}(x+1) = \frac{5x+5}{6}$	[ind]
57)	$\frac{x+1}{3} + \frac{1}{2}x - \frac{3}{4} = \frac{2x-3}{12} - \frac{1-x}{6}$	[0]
58)	$\frac{8x+17}{5} - \frac{(3x-1)^2}{10} + \frac{9}{10}x^2 = \frac{7-3x}{25} - 2x+1$	[-101/216]

- 59) $\frac{(x-1)^2}{2} - \frac{1-3x}{6} = \frac{(3x-2)^2}{9} - \frac{1}{2}x^2 + 2$ [38/15]
- 60) $\frac{2x-3}{5} - \frac{5x+18}{20} = \frac{x+6}{12} - 2$ [0]
- 61) $\frac{3+7x}{4} - \frac{9-x}{11} = \frac{19+15x}{44} - \frac{1-3x}{2}$ [ind]
- 62) $x + \frac{2}{3} = \frac{2(x-3)}{3} - \frac{1}{2} + \frac{1+2x}{6}$ [imp]
- 63) $\frac{2-x}{3} + \frac{3+2x}{4} = \frac{5-x}{12} + 1 - 3x$ [0]
- 64) $\frac{2x-1}{7} + \frac{1-2x}{6} = \frac{x-1}{2} - \frac{18x+2}{21}$ [-2]
- 65) $\frac{43x-12}{3} + \frac{8x+5}{10} = \frac{x-16}{18} + 15x - 3$ [-5]
- 66) $\frac{16+3x}{9} + \frac{x+41}{6} - \frac{-5x+31}{15} = \frac{1+5x}{6}$ [imp]
- 67) $\frac{15-3x}{77} - \frac{2+6x}{11} = \frac{7}{539} - x$ [0]
- 68) $\frac{11x-56}{30} - 2x + 3 = \frac{6-5x}{12} - \frac{5x+2}{5} + \frac{1}{5}$ [2]
- 69) $\frac{2x-3}{3} - \frac{2x-9}{9} = \frac{12x-27}{27}$ [imp]
- 70) $\frac{3}{5}x = \frac{7(x-1)}{20} + \frac{x}{4}$ [imp]
- 71) $\frac{2x+295}{121} - \frac{x-7}{11} = x + 2$ [1]
- 72) $\frac{x+7}{8} + \frac{x-1}{4} - \frac{1-x}{2} = \frac{7x+1}{8}$ [ind]
- 73) $1 - \frac{3-4x}{5} + \frac{2}{3}x = \frac{3}{2}$ [3/4]
- 74) $\frac{x-1}{2} - \frac{x+1}{3} = \frac{2-3x}{12}$ [12/5]
- 75) $\frac{21x}{12} - \frac{5(6x+8)}{18} = \frac{5-32x}{16}$ [181/60]
- 76) $(x-1)^2 - \frac{5x-2}{3} = \frac{(3x+2)^2}{9} + 6x$ [1/9]
- 77) $\frac{5x-1}{14} - \frac{103-30x}{84} = \frac{11x-6}{12} - 3x + 2$ [1]

EQUAZIONI FRATTE (le equazioni indicate con * sono impossibili per il campo di esistenza)

- 78) $\frac{1}{x+1} = \frac{1}{1-x}$ [0]
- 79) $\frac{1}{x^2-x} - \frac{1}{x^2+x} = \frac{x^2+1}{x^2-1} - 1$ [imp]*
- 80) $\frac{3x+1}{2x-4} - \frac{6x+1}{3x-6} + \frac{1}{2} = 0$ [imp]
- 81) $\frac{x}{2x-4} + \frac{x-1}{3x+6} = 2 - \frac{48-7x^2}{24-6x^2}$ [imp]
- 82) $\frac{2x-7}{4-x} + \frac{5x+2}{3+x} = \frac{-7}{x^2-x-12} + 3$ [imp]*
- 83) $\frac{2x}{x-1} = \frac{1-2x}{x+1} - \frac{4x^2+1}{1-x^2}$ [0]
- 84) $\frac{3x^2+1}{x^2} - \frac{x+3}{x} - 2 = 0$ [1/3]
- 85) $\frac{x-1}{x^3+3x^2+3x+1} - \frac{-5}{x^3+1} = \frac{1}{x^2-x+1}$ [-1/3]
- 86) $\frac{2-x}{x^2-2x-3} + \frac{2(x+2)}{x^2+4x+3} = \frac{x-6}{x^2-9}$ [0]
- 87) $\frac{x}{x-5} = \frac{3}{x+3} - \frac{x-30}{x^2-2x-15} + 1$ [0]
- 88) $\frac{2x}{x^2-10x+25} + \frac{x+3}{x-5} = 1$ [4]
- 89) $\frac{3-x}{5x+1} + \frac{1-2x^2}{2-x} - 2x = \frac{19x^2+4x}{5x^2-9x-2}$ [imp]

- 90) $\frac{x-1}{x+3} - \frac{x+1}{2-x} = \frac{17-x}{x^2+x-6} + 2$ [ind]
- 91) $\frac{-2x}{4x^2+2x+1} - \frac{2x}{1-2x} = \frac{4x}{8x^3-1} + 1$ [imp]
- 92) $\frac{x}{x+3} - \frac{2x-3}{x+1} = \frac{11-x^2}{x^2+4x+3}$ [imp]*
- 93) $\frac{x}{4x^2-9} + \frac{1}{3-2x} - \frac{1}{3+2x} = 0$ [0]
- 94) $\frac{x-1}{x} + \frac{2-x}{x^2} = \frac{-2}{x-3} + 1$ [3/4]
- 95) $\frac{x+1}{x^2-3x+2} = \frac{x+1}{x^2-5x+6} - \frac{3}{x^2-4x+3}$ [8]
- 96) $\frac{x-2}{x^2-x} + \frac{x+2}{x^2+x} - \frac{2x}{x^2-1} = 0$ [imp]
- 97) $\frac{2x-1}{x^2-4} + \frac{x-3}{x^2-7x+10} = \frac{3x-2}{x^2-3x-10}$ [-5/4]
- 98) $\frac{-2x-4}{x^4-1} - \frac{x+2}{x^2+1} = \frac{1}{x-1} - \frac{2x+3}{x^2-1}$ [ind]
- 99) $\frac{2}{x^2+2x+1} + \frac{1}{x+1} = \frac{x}{x-1} - 1$ [imp]
- 100) $\frac{x^2-4}{2x^3-x^2-2x+1} - \frac{2x}{1-x^2} = \frac{4x+3}{2x-1} - 2$ [imp]*
- 101) $\frac{x^2}{x^2+x-12} - \frac{1-x^2}{x^3+2x^2-11x-12} = 1$ [imp]*
- 102) $\frac{2x+3}{2x^2-2x} + \frac{6-7x}{4x^2+4x} = \frac{46-6x}{8x^2-8}$ [ind]
- 103) $\frac{5-24x}{9x^2-24x+16} - \frac{6x}{4-3x} = 2$ [imp]
- 104) $\frac{1}{2x} = \frac{3-x^2}{x^2-3x} + \frac{1-x}{3-x}$ [imp]*
- 105) $\frac{2x^2}{x^3-8} - \frac{x-5}{x-2} = 1 - \frac{2x^2-x+3}{x^2+2x+4}$ [-2]
- 106) $\frac{24}{4-9x^2} - \frac{3x+2}{2x-3x^2} = \frac{3x-2}{3x^2+2x}$ [ind]
- 107) $\frac{8}{x^2-25} = \frac{x-1}{x^2-11x+30} + \frac{2-x}{x^2-4x-5}$ [17/67]
- 108) $\frac{6x-1}{x^2-6x+9} - \frac{9}{x^2-9} = \frac{x^2-1}{x^2-6x+9} - 1$ [imp]*
- 109) $\frac{2}{3} = \frac{x-3}{x-2}$ [5]
- 110) $\frac{x+6}{2-x} = \frac{x-1}{x-2} + 1$ [-1]
- 111) $\frac{x+2}{x+1} = \frac{x-2}{x-1}$ [0]
- 112) $\frac{x-2}{x+2} = \frac{x+2}{x-2}$ [0]
- 113) $\frac{1-3x}{1-2x} = \frac{3}{2x-1} + 3$ [-1/3]
- 114) $\frac{5x-2}{5} = \frac{2}{x-2} + x$ [-3]
- 115) $\frac{x^2-x}{4-x^2} = \frac{4-x}{16-x^2} - 1$ [imp]*
- 116) $\frac{x-3}{2-x} + \frac{4x-3}{x+7} = \frac{9}{x^2+5x-14} + 3$ [imp]*
- 117) $\frac{1-2x}{x} - \frac{4}{3x^2+x} = \frac{12}{3x+1} - 2$ [imp]*
- 118) $\frac{1}{x^2} + \frac{x^2}{x^2-1} = \frac{2-x}{x^2-x^3} - \frac{2-x^3}{x^3-x}$ [-1/3]
- 119) $\frac{2-x}{x^2-x} - \frac{3}{x^2+x-2} + \frac{x+1}{x} - 1 = 0$ [imp]*
- 120) $\frac{x^3+x^2+14}{x^3-7x+6} - \frac{x+3}{x^2-3x+2} = \frac{x-1}{x^2+x-6} - \frac{x-2}{1-x}$ [imp]*
- 121) $\frac{2(x-1)}{2x^2+x-1} = \frac{4x^2}{4x^2-1} - 1 + \frac{2}{2x+1}$ [-1/5]
- 122) $\frac{1}{x} - \frac{x+1}{x} = \frac{1}{x-1} - 1$ [imp]*

$$123) \quad \frac{x-1}{x+8} = \frac{1-2x}{3-x} + \frac{x^2+35}{x^2+5x-24} - 2 \quad [\text{imp}]^*$$

EQUAZIONI LETTERALI

- 124) $ax=2x-a+2$ [se $a \neq 2$ $x=-1$; se $a=2$ indeterminata]
 125) $a(2x-1)=x-a+3$ [se $a \neq \frac{1}{2}$ $x=\frac{3}{2a-1}$; se $a=\frac{1}{2}$ impossibile]
 126) $(a-x)(x+1)=x(2a-x)-a-2$ [se $a \neq -1$ $x=2$; se $a=-1$ indeterminata]
 127) $(2x-3a)^2=(x+a)^2+3(x-a)(x+a)$ [se $a \neq 0$ $x=\frac{11}{14}a$; se $a=0$ indeterminata]
 128) $x-(a+1)(a-1)-a(x-2)+3ax=0$ [se $a \neq -\frac{1}{2}$ $x=\frac{a^2-2a-1}{2a+1}$; se $a=-\frac{1}{2}$ impossibile]
 129) $3x-2a+2ax-3=0$ [se $a \neq -\frac{3}{2}$ $x=1$; se $a=-\frac{3}{2}$ indeterminata]
 130) $(a-3x)^2=7x^2-(a-x)(a+2x)$ [se $a \neq 0$ $x=\frac{2}{5}a$; se $a=0$ indeterminata]
 131) $x-3a+1=2x-ax-5$ [se $a \neq 1$ $x=\frac{3a-6}{a-1}$; se $a=1$ impossibile]
 132) $a=-a+ax$ [se $a \neq 0$ $x=2$; se $a=0$ indeterminata]
 133) $(x-2)^2+(x-a)^2=2(x-2)(x-a)$ [se $a \neq 2$ impossibile; se $a=2$ indeterminata]
 134) $(a-1)(a-x)(x-1)=x^2(a+1)-a(a+1)+1+a$ [se $a \neq \pm 1$ $x=-\frac{1}{a+1}$; se $a=-1$ imp; se $a=1$ ind]
 135) $ax(a-2)-5(3x-1)=a$ [se $a \neq 5$ e $a \neq -3$ $x=\frac{1}{a+3}$; se $a=-3$ imp; se $a=5$ ind]
 136) $ax(a+1)=a$ [se $a \neq 0$ e $a \neq -1$ $x=\frac{1}{a+1}$; se $a=-1$ imp; se $a=0$ ind]
 137) $(2x+3)^2-(2x-a)^2=(a+3)(4x-a)$ [se $a \neq -3$ impossibile; se $a=-3$ indeterminata]
 138) $x-2a+3x-5ax-2+8a-3ax+4-4a=0$ [se $a \neq \frac{1}{2}$ $x=\frac{a+1}{4a-2}$; se $a=\frac{1}{2}$ impossibile]
 139) $ax-bx=a-b$ [se $a \neq b$ $x=1$; se $a=b$ indeterminata]
 140) $ax+bx=a-b$ [se $a \neq -b$ $x=\frac{a-b}{a+b}$; se $a=-b=0$ ind; se $a=-b \neq 0$ imp]
 141) $(a^2-b^2)x=a-b$ [se $a \neq \pm b$ $x=\frac{1}{a+b}$; se $a=-b$ imp; se $a=b$ ind]
 142) $(a-2b)^2-(x-2a)^2=(b-2x)^2-5x^2-4ab$ [se $a \neq -b$ $x=\frac{3(a-b)}{4}$; se $a=-b$ ind]
 143) $(x-a)(x-b)-(a-b)(x-1)=(x-1)(x-b)-(x-a)(a-b)$ [se $a \neq 1$ $x=2b-a$; se $a=1$ ind]
 144) $a(x-1)=xb-2$ [se $a \neq b$ $x=\frac{a-2}{a-b}$; se $a=b=2$ ind; se $a=b \neq 2$ imp]

DISEQUAZIONI DI PRIMO GRADO

- 145) $5(x-3) > x-5$ [$x > 5/2$]
 146) $(2x-1)^2 \geq (x-2)^2 + x(3x-2)$ [$x \geq 3/2$]
 147) $2(x-1)(x-2) - 4(x-1)^2 \leq -2(x^2-1)$ [$x \leq 1$]
 148) $1 - (x-2)(x+2) < 4x - (x-3)^2$ [$x > 7/5$]
 149) $(x+3)^2 > (5+x)x + 4x$ [$x < 3$]
 150) $(3x+1)^2 - 4x(x-2) \leq 5x(x+6) - 16x$ [imp]
 151) $(x-2)(2x+1) < 2x(x-3) + 3x$ [$\forall x \in \mathbb{R}$]
 152) $\frac{3x+1}{4} - \frac{2x+1}{2} < 1$ [$x > -5$]
 153) $\frac{3-2x}{3} - \frac{1-x}{4} > 2 - \frac{3x-2}{6}$ [$x > 19$]
 154) $(x+1)(x-2)(x+2) \geq (x+1)^3 - 2x^2$ [$x \leq -5/7$]
 155) $12 < (1+3x)^2 - (1-3x)^2$ [$x > 1$]
 156) $\frac{1}{3} + \frac{2}{3}x - \frac{5}{6}x < x+1 - \frac{2}{3}x$ [$x > -4/3$]
 157) $\frac{1-x^2}{4} < \frac{5+3x}{15} - \frac{3x^2-2x}{12}$ [$x > -5/22$]
 158) $(2-\sqrt{5})x - \sqrt{5} + 2 > 0$ [$x < -1$]
 159) $\frac{3x}{1+\sqrt{2}} - \frac{2x+1}{1-\sqrt{2}} \leq 1$ [$x \leq -\frac{\sqrt{2}+10}{49}$]