

## Sistemi simmetrici di secondo grado

risolvere i seguenti sistemi simmetrici					
1	$\begin{cases} x + y = 1 \\ xy = -6 \end{cases}$	$(-2, 3), (3, -2)$	6	$\begin{cases} x^2 + y^2 = \frac{1}{81} + 3xy \\ 4x + 4y = -\frac{16}{9} \end{cases}$	$(-\frac{1}{3}, -\frac{1}{9}), (-\frac{1}{9}, -\frac{1}{3})$
2	$\begin{cases} x + y = \frac{14}{9} \\ xy = \frac{40}{81} \end{cases}$	$(\frac{10}{9}, \frac{4}{9}), (\frac{4}{9}, \frac{10}{9})$	7	$\begin{cases} x + y = \frac{1}{3} \\ x^2 + y^2 = \frac{65}{18} \end{cases}$	$(-\frac{7}{6}, \frac{3}{2}), (\frac{3}{2}, -\frac{7}{6})$
3	$\begin{cases} x + y = -\frac{9}{10} \\ xy = \frac{1}{5} \end{cases}$	$(-\frac{2}{5}, -\frac{1}{2}), (-\frac{1}{2}, -\frac{2}{5})$	8	$\begin{cases} x + y = \frac{20}{3} \\ x^2 - xy + y^2 = \frac{175}{9} \end{cases}$	$(5, \frac{5}{3}), (\frac{5}{3}, 5)$
4	$\begin{cases} x + y = -\frac{23}{8} \\ xy = -\frac{9}{2} \end{cases}$	$(-4, \frac{9}{8}), (\frac{9}{8}, -4)$	9	$\begin{cases} x^2 + y^2 = \frac{181}{49} \\ xy = -\frac{90}{49} \end{cases}$	$(\frac{9}{7}, -\frac{10}{7}), (-\frac{10}{7}, \frac{9}{7})$ $(-\frac{9}{7}, \frac{10}{7}), (\frac{10}{7}, -\frac{9}{7})$
5	$\begin{cases} x + y = 0 \\ xy = 1 \end{cases}$	Nessuna soluzione	10	$\begin{cases} x^2 + y^2 = 164 \\ xy = -80 \end{cases}$	$(-8, 10), (10, -8)$ $(8, -10), (-10, 8)$

risolvere i seguenti sistemi simmetrici a coefficienti letterali		
11	$\begin{cases} x + y + 21b = 1 \\ xy + 90 = 189b \end{cases}$	$(10 - 21b, -9)$ $(-9, 10 - 21b)$
12	$\begin{cases} 9x + 9y = 13b + 45 \\ 3xy = 35b - \frac{56b^2}{9} \end{cases}$	$(5 - \frac{8b}{9}, \frac{7b}{3})$ $(\frac{7b}{3}, 5 - \frac{8b}{9})$
13	$\begin{cases} x + y = \frac{2b}{3} \\ x^2 + y^2 = \frac{10b^2}{9} \end{cases}$	$(-\frac{b}{3}, b)$ $(b, -\frac{b}{3})$
14	$\begin{cases} 10b^2 + xy = 17b + 48 \\ x + 19 = 3b - y \end{cases}$	$(-3 - 2b, 5b - 16)$ $(5b - 16, -3 - 2b)$
15	$\begin{cases} x - 18 = 10b - y \\ xy - 56 = b(21b + 110) \end{cases}$	$(3b + 14, 7b + 4)$ $(7b + 4, 3b + 14)$
16	$\begin{cases} x - \frac{29b}{7} + y = 0 \\ \frac{x^2 + y^2}{5} = \frac{101b^2}{49} \end{cases}$	$(3b, \frac{8b}{7})$ $(\frac{8b}{7}, 3b)$
17	$\begin{cases} x + y + b = 0 \\ x^2 + y^2 = 5b^2 \end{cases}$	$(b, -2b)$ $(-2b, b)$
18	$\begin{cases} x + y + 5 = 8b \\ 7b^2 - xy = 41b + 6 \end{cases}$	$(7b + 1, b - 6)$ $(b - 6, 7b + 1)$

19	$\begin{cases} 3xy + 36b^2 = 18b \\ \frac{y}{2}(1+x) + 6b^2 = 5b + \frac{1-x}{2} \end{cases}$	$(1-2b, 6b)$ $(6b, 1-2b)$
20	$\begin{cases} x + y + \frac{b}{3} = 1 \\ x^2 + y^2 - 1 = \frac{b^2 - 3xy - b}{9} \end{cases}$	$(1, -\frac{b}{3})$ $(-\frac{b}{3}, 1)$

risolvere i seguenti sistemi simmetrici di terzo grado

21	$\begin{cases} x + y = -\frac{5}{2} \\ x^3 + y^3 = -\frac{35}{8} \end{cases}$	$(-1, -\frac{3}{2})$ $(-\frac{3}{2}, -1)$
22	$\begin{cases} x + y = -1 \\ x^3 + y^3 = -\frac{1}{3} \end{cases}$	$(-\frac{2}{3}, -\frac{1}{3})$ $(-\frac{1}{3}, -\frac{2}{3})$
23	$\begin{cases} x + y = -2 \\ x^3 + y^3 = -\frac{31}{2} \end{cases}$	$(-\frac{5}{2}, \frac{1}{2})$ $(\frac{1}{2}, -\frac{5}{2})$
24	$\begin{cases} x + y = 2\sqrt{7} - 1 \\ x^3 + y^3 = 17\sqrt{7} - 22 \end{cases}$	$(\sqrt{7}, \sqrt{7} - 1)$ $(\sqrt{7} - 1, \sqrt{7})$
25	$\begin{cases} x + y = 3\sqrt{6} \\ x^3 + y^3 = 54\sqrt{6} \end{cases}$	$(\sqrt{6}, 2\sqrt{6})$ $(2\sqrt{6}, \sqrt{6})$
26	$\begin{cases} x + y = \frac{b}{4} \\ x^3 + y^3 = \frac{127b^3}{64} \end{cases}$	$(\frac{7b}{4}, -\frac{3b}{2})$ $(-\frac{3b}{2}, \frac{7b}{4})$
27	$\begin{cases} x + y = -\frac{10b}{3} \\ x^3 + y^3 = -\frac{250b^3}{27} \end{cases}$	$(-\frac{5b}{3}, -\frac{5b}{3})$
28	$\begin{cases} x + y = b \\ x^3 + y^3 = \frac{67b^3}{25} \end{cases}$	$(\frac{7b}{5}, -\frac{2b}{5})$ $(-\frac{2b}{5}, \frac{7b}{5})$
29	$\begin{cases} x + y = -\frac{b}{12} \\ x^3 + y^3 = -\frac{37b^3}{1728} \end{cases}$	$(-\frac{b}{3}, \frac{b}{4})$ $(\frac{b}{4}, -\frac{b}{3})$

30	$\begin{cases} x + y = 4b - 6 \\ \frac{x^3 + y^3}{4b - 6} = 31b^2 + 42b + 36 \end{cases}$	$(5b, -b - 6)$ $(-b - 6, 5b)$ , $b \neq \frac{3}{2}$
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risolvere i seguenti sistemi omogenei

31	$\begin{cases} 3y^2 + x^2 = 4xy \\ 3y^2 = xy \end{cases}$	$(\alpha, \frac{\alpha}{3})$ , $\forall \alpha \in \mathbb{R}$
32	$\begin{cases} 3y^2 + 20xy = 128x^2 \\ 3y^2 + 32xy = 0 \end{cases}$	$(\alpha, -\frac{32\alpha}{3})$ , $\forall \alpha \in \mathbb{R}$
33	$\begin{cases} 45y^2 + 14x^2 = 53xy \\ 36y^2 + 17xy = 35x^2 \end{cases}$	$(\alpha, \frac{7\alpha}{9})$ , $\forall \alpha \in \mathbb{R}$
34	$\begin{cases} 15y^2 = 2x^2 + 7xy \\ 10y^2 + 5x^2 = -27xy \end{cases}$	$(\alpha, -\frac{\alpha}{5})$ , $\forall \alpha \in \mathbb{R}$
35	$\begin{cases} 7y^2 + 8x^2 = -15xy \\ y^2 + xy = 0 \end{cases}$	$(\alpha, -\alpha)$ , $\forall \alpha \in \mathbb{R}$
36	$\begin{cases} 30y^2 = 20x^2 + xy \\ 36y^2 + 35x^2 = 72xy \end{cases}$	$(\alpha, \frac{5\alpha}{6})$ , $\forall \alpha \in \mathbb{R}$
37	$\begin{cases} 49y^2 = 63xy + 10x^2 \\ 21y^2 = 23xy + 10x^2 \end{cases}$	$(\alpha, \frac{10\alpha}{7})$ , $\forall \alpha \in \mathbb{R}$
38	$\begin{cases} y^2 + 6x^2 = 3\sqrt{3}xy \\ y^2 - 6x^2 = -\sqrt{3}xy \end{cases}$	$(\alpha, \sqrt{3}\alpha)$ , $\forall \alpha \in \mathbb{R}$
39	$\begin{cases} 28y^2 + 39xy + 5x^2 = 0 \\ 12y^2 = 13xy + 35x^2 \end{cases}$	$(\alpha, -\frac{5\alpha}{4})$ , $\forall \alpha \in \mathbb{R}$
40	$\begin{cases} 4y^2 + 5\sqrt{13}xy = 117x^2 \\ 28y^2 + 468x^2 = -79\sqrt{13}xy \end{cases}$	$(\alpha, -\frac{9\sqrt{13}\alpha}{4})$ , $\forall \alpha \in \mathbb{R}$

risolvere i seguenti sistemi di tipo particolare

41	$\begin{cases} 9y^2 + 12xy + 4x^2 = 9 \\ 4y^2 + 33xy + 8x^2 = 0 \end{cases}$	$(\pm \frac{12}{5}, \mp \frac{3}{5})$ $(\pm \frac{3}{22}, \mp \frac{12}{11})$
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42	$\begin{cases} 2y^2 + 2xy + 3x^2 = 3 \\ 2y^2 + 3xy - 2x^2 = 0 \end{cases}$	$\left( \pm \frac{\sqrt{3}}{\sqrt{7}}, \mp 2 \frac{\sqrt{3}}{\sqrt{7}} \right)$ $\left( \pm \frac{\sqrt{2}}{\sqrt{3}}, \pm \frac{1}{\sqrt{6}} \right)$
43	$\begin{cases} x^2 + y^2 = 1 \\ 6y^2 + 21x^2 = 23xy \end{cases}$	$\left( \pm \frac{3}{\sqrt{58}}, \pm \frac{7}{\sqrt{58}} \right)$ $\left( \pm \frac{2}{\sqrt{13}}, \pm \frac{3}{\sqrt{13}} \right)$
44	$\begin{cases} y^2 + 2xy = 3 \\ 4y^2 + 31xy = 8x^2 \end{cases}$	$\left( \pm \frac{1}{4}, \mp 2 \right)$ $\left( \pm \frac{4\sqrt{3}}{3}, \pm \frac{\sqrt{3}}{3} \right)$
45	$\begin{cases} 7y^2 + 6xy + 24x^2 = 8 \\ 3y^2 + 2xy - 8x^2 = 0 \end{cases}$	$\left( \pm \frac{1}{\sqrt{5}}, \mp \frac{2}{\sqrt{5}} \right)$ $\left( \pm \frac{3}{5\sqrt{2}}, \pm \frac{2\sqrt{2}}{5} \right)$
46	$\begin{cases} y^2 + xy = 0 \\ 18y^2 + 5x^2 + 40xy = 20 \end{cases}$	$(\pm 2, 0)$
47	$\begin{cases} 8y^2 + 5xy + 5x^2 = 10 \\ 5y^2 + 3xy = 0 \end{cases}$	$(\pm\sqrt{2}, 0)$ $\left( \pm \frac{5\sqrt{5}}{\sqrt{61}}, \mp \frac{3\sqrt{5}}{\sqrt{61}} \right)$
48	$\begin{cases} 8y^2 + 27xy + 6x^2 = 6 \\ 9y^2 - 12xy + 4x^2 = 0 \end{cases}$	$\left( \pm \frac{3\sqrt{3}}{2\sqrt{31}}, \pm \sqrt{\frac{3}{31}} \right)$
49	$\begin{cases} y^2 + 6xy + 2x^2 = 1 \\ 32y^2 + 68xy + 35x^2 = 0 \end{cases}$	<i>Nessuna soluzione</i>
50	$\begin{cases} y^2 + 10xy + 6x^2 = 3 \\ 4y^2 - 15xy + 9x^2 = 0 \end{cases}$	$\left( \pm \frac{4}{5\sqrt{3}}, \pm \frac{\sqrt{3}}{5} \right)$ $\left( \pm \frac{1}{\sqrt{15}}, \pm \frac{3}{\sqrt{15}} \right)$

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51	$\begin{cases} 9y^2 + 10xy + 2x^2 = 6 \\ 36y^2 + 40xy + 17x^2 = 27 \end{cases}$	$\left( \pm \frac{\sqrt{3}}{3}, \mp \frac{2\sqrt{3}}{3} \right)$ $\left( \pm \frac{\sqrt{3}}{3}, \pm \frac{8}{9\sqrt{3}} \right)$
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52	$\begin{cases} 8y^2 + 20xy + 5x^2 = 20 \\ 33y^2 + 71xy + x^2 = 100 \end{cases}$	$\left( \pm \frac{2\sqrt{5}}{\sqrt{17}}, \mp \frac{6\sqrt{5}}{\sqrt{17}} \right)$
53	$\begin{cases} y^2 + 5xy + x^2 = 1 \\ 3y^2 + 9xy - 26x^2 = 4 \end{cases}$	$\begin{aligned} &(\pm 1, \mp 5) \\ &\left( \pm \frac{1}{\sqrt{7}}, \mp \frac{6}{\sqrt{7}} \right) \end{aligned}$
54	$\begin{cases} 6y^2 + 24xy + 5x^2 = 30 \\ y^2 + 10xy + 3x^2 = 12 \end{cases}$	$\left( \pm \sqrt{\frac{6}{7}}, \pm \sqrt{\frac{6}{7}} \right)$
55	$\begin{cases} 10y^2 + 35xy + 21x^2 = 6 \\ 4y^2 + 12xy + 7x^2 = 2 \end{cases}$	$\begin{aligned} &(\pm 1, \mp \frac{1}{2}) \\ &\left( \pm \frac{\sqrt{2}}{\sqrt{7}}, 0 \right) \end{aligned}$
56	$\begin{cases} 9y^2 + 80xy + 12x^2 = 8 \\ y^2 + 11xy - 2x^2 = 4 \end{cases}$	Nessuna soluzione
57	$\begin{cases} 6y^2 + 3xy + 4x^2 = 2 \\ 8y^2 - 6xy - x^2 = 4 \end{cases}$	$\left( \pm \frac{\sqrt{2}}{\sqrt{13}}, \mp \frac{3}{\sqrt{26}} \right)$
58	$\begin{cases} xy + 9x^2 = 3 \\ -y^2 - xy + 36x^2 = 12 \end{cases}$	$\begin{aligned} &\left( \pm \frac{\sqrt{3}}{3}, 0 \right) \\ &\left( \pm \frac{\sqrt{3}}{2}, \mp \frac{5\sqrt{3}}{2} \right) \end{aligned}$
59	$\begin{cases} 108y^2 + 3xy + 4x^2 = 12 \\ 969y^2 + 23xy + 36x^2 = 108 \end{cases}$	$\begin{aligned} &(\pm\sqrt{3}, 0) \\ &\left( \pm \frac{1}{4}, \mp \frac{1}{3} \right) \end{aligned}$
60	$\begin{cases} 163y^2 + 441xy + 19x^2 = 168 \\ 3x^2 + 64xy + 24y^2 = 24 \end{cases}$	Nessuna soluzione