Solve $2x + y = 5$

$x - 3y = -1$

$\times 3$

$\times 1$

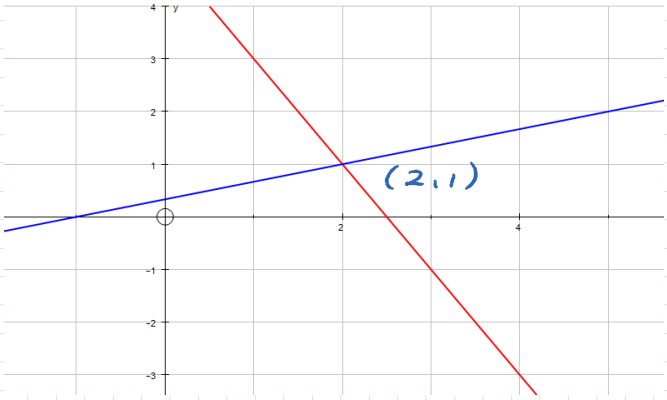
$6x + 3y = 15$

$x - 3y = -1$

$7x = 14$

$x = 2$

$y = 1$ $(2, 1)$



Type 2 : 3 x 3 Sim Eq

Solve

$x + y + z = 19$ --(I)

$2x + 3y + z = 16$ --(II)

$3x - 4y + 2z = 1$ --(III)

Elim z from (I) & (II)

$-x + y + z = -19$

$2x + 3y + z = 16$

$x + 2y = -3$ --(IV)

Elim z from (II) and (III)

$\times 2$

$\times 1$

$4x + 6y + 2z = 32$

$-3x + 4y + 2z = -1$

$x + 10y = 31$ --(V)

Elim x from (IV) and (V)

$-x + 2y = +3$

$x + 10y = 31$

$8y = 34$

$y = \frac{34}{8} = \frac{17}{4}$

Type 3: Substitution.

Solve $x+y=3$ and $x^2+y^2=5$

$x^2+y^2=5$

$x+y=\sqrt{5}$

$4+9=13$

$2+3=\sqrt{13}$

$\sqrt{a}+\sqrt{b}\neq\sqrt{a+b}$

$x+y=3$ $\quad x^2+y^2=5$

$x^2+2xy+y^2=9$

$x+y=3$

$y=3-x$

$x^2+y^2=5$

$x^2+(3-x)^2=5$

$x^2+9-6x+x^2-5=0$

$2x^2-6x+4=0$

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

$(x-1)(x-2)=0$

$x=1 \quad x=2$

$y=3-x$

$x=1 \quad y=2 \quad (1,2)$

$x=2 \quad y=1 \quad (2,1)$

Solve $x+2y=5$ and

$x^2+y^2=10$

$2y=5-x$

$y=\frac{5-x}{2}$

$x+2y=5$

$x=5-2y$

$(5-2y)^2+y^2=10$

$$(5-2y)^2 + y^2 = 10$$

$$25 - 20y + 4y^2 + y^2 = 10$$

$$5y^2 - 20y + 15 = 0$$

$$y^2 - 4y + 3 = 0$$

$$(y-1)(y-3) = 0$$

$$y - 1 = 0 \qquad y - 3 = 0$$

$$y = 1 \qquad y = 3$$

$$x = 5 - 2y$$

$y = 1 \Rightarrow x = 5 - 2(1)$

$= 5 - 2 = 3$

$y = 3 \Rightarrow x = 5 - 2(3)$

$= 5 - 6 = -1$

Solve $2x + 3y = 5$ and $x^2 + y^2 = 2$.

$2x + 3y = 5$

$2x + 3y = 5$

$3y = 5 - 2x$

$$y = \frac{5-2x}{3}$$

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

$$x^2 + \frac{25 - 20x + 4x^2}{9} = 2$$

$$9x^2 + 25 - 20x + 4x^2 = 18$$

$13x^2 - 20x + 7 = 0$ C-N (13)(7)
Add -20

$13x^2 - 13x - 7x + 7 = 0$

$13x(x-1) - 7(x-1) = 0$

$(x-1)(13x-7) = 0$

$x = 1 \qquad x = \frac{7}{13}$

$y = \frac{5-2x}{3}$

$x = 1 \qquad y = \frac{5-2}{3} = 1$

$x = \frac{7}{13} \qquad y = \frac{5-2\left(\frac{7}{13}\right)}{3} = \frac{17}{13}$

$2x + 3y = 5$

$2x = 5 - 3y$

$x = \frac{5-3y}{2}$

$x^2 + y^2 = 2$

$\left(\frac{5-3y}{2}\right)^2 + y^2 = 2$

$\frac{25 - 30y + 9y^2}{4} + y^2 = 2$

$25 - 30y + 9y^2 + 4y^2 = 8$

$13y^2 - 30y + 17 = 0$

Type 4: Become Simultaneous

$a(x+1)+b(x+3)=5x+9$ for a

a find a and b.

$$ax+a+bx+3b=5x+9$$

$$ax+bx=5x$$

$$-a+-b=-5$$

$$a+3b=9$$

$$2b=4$$

$$b=2$$

$$a=3$$

Write in form $(x+a)^2+b$ and

solve $x^2-6x-11=0$

$$x^2-6x-11=0$$

$$x^2-6x+9-11-9=0$$

$$(x-3)^2-20=0$$

$$(x-3)^2=20$$

$$x-3=\pm\sqrt{20}$$

$$x=3\pm\sqrt{20}$$

$y=5-8x-x^2$ find maximum

pont.

$$y = 5 - 8x - x^2$$

$$-y = x^2 + 8x - 5$$

$$-y = x^2 + 8x + 16 - 5 - 16$$

$$-y = (x+4)^2 - 21$$

$$y = 21 - (x+4)^2$$

Maximum $(-4, 21)$

Solve $(3x-1)^2 - 7(3x-1) - 8 = 0$

$$t = 3x - 1$$

$$t^2 - 7t - 8 = 0$$

$$(t-8)(t+1) = 0$$

$t = 8$ $\quad$ $t = -1$

$3x - 1 = 8$ $\quad$ $3x - 1 = -1$

$3x = 9$ $\quad$ $3x = 0$

$x = 3$ $\quad$ $x = 0$.

Solve $x+y=7$ and $x^2+y^2=25$

$x+y=7$

$y=7-x$

$x^2+(7-x)^2=25$

$x^2+49-14x+x^2-25=0$

$2x^2-14x+24=0$

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

$(x-3)(x-4)=0$

$x=3 \quad x=4$

$y=7-x$

$y=4 \quad y=3$

Solve $x-3y=-1$ and $x^2+y^2=5$

$x-3y=-1$

$x=3y-1$

$x^2+y^2=5$

$(3y-1)^2+y^2-5=0$

$9y^2-6y+1+y^2-5=0$

$10y^2-6y-4=0$

$5y^2-3y-2=0$

$$5y^2 - 5y + 2y - 2 = 0$$

$$5y(y-1) + 2(y-1) = 0$$

$$(y-1)(5y+2) = 0$$

$$y = 1 \qquad y = -\frac{2}{5}$$

$$x = 3y - 1$$

$y = 1$ $\qquad x = 3 - 1 = 2$

$y = -\frac{2}{5}$ $\qquad x = -\frac{6}{5} - \frac{5}{5} = -\frac{11}{5}$