

# System of Equations

## Practice

$$1. \begin{cases} x - 7y = -11 \\ 5x + 2y = -18 \end{cases}$$

$$2. \begin{cases} 7x - 8y = -12 \\ -4x + 2y = 3 \end{cases}$$

$$3. \begin{cases} 3x + 9y = -6 \\ 4x - 12y = 8 \end{cases}$$

$$4. \begin{cases} -12x + 2y = 0 \\ 6x - 5y = 8 \end{cases}$$

$$5. \begin{cases} -2x + 10y = 2 \\ 5x - 20y = 3 \end{cases}$$

$$6. \begin{cases} 2x + 3y = 20 \\ 7x + 2y = 53 \end{cases}$$

# System of Equations

## Practice

$$1. \begin{cases} x - 7y = -11 \\ 5x + 2y = -18 \end{cases} \quad x = -11 + 7y$$

$$5(-11 + 7y) + 2y = -18 \\ -55 + 35y + 2y = -18 \\ 37y = 37 \\ y = 1$$

$$x - 7(1) = -11 \\ x - 7 = -11 \\ x = -4$$

$$\boxed{(-4, 1)}$$

$$2. \begin{cases} 7x - 8y = -12 \\ -4x + 2y = 3 \end{cases}$$

$$2y = 4x + 3 \\ y = 2x + \frac{3}{2}$$

$$7x - 8(2x + \frac{3}{2}) = -12$$

$$7x - 16x - 12 = -12$$

$$-9x = 0 \\ x = 0$$

$$\boxed{(0, \frac{3}{2})}$$

$$-4(0) + 2y = 3$$

$$2y = 3$$

$$y = \frac{3}{2}$$

$$3. \begin{cases} 3x + 9y = -6 \\ 4x - 12y = 8 \end{cases}$$

$$4x - 12y = 8$$

$$3x = -9y - 6$$

$$x = -3y - 2$$

$$4(-3y - 2) - 12y = 8$$

$$-12y - 8 - 12y = 8$$

$$-24y = 16$$

$$y = 0$$

$$\boxed{(-2, 0)}$$

$$3x + 9(0) = -6$$

$$3x = -6$$

$$x = -2$$

$$4. \begin{cases} -12x + 2y = 0 \\ 6x - 5y = 8 \end{cases}$$

$$-12x + 2y = 0$$

$$12x + 10y = 16$$

$$-8y = 16$$

$$y = -2$$

$$6x - 5(-2) = 8$$

$$6x + 10 = 8$$

$$6x = -2$$

$$x = -\frac{1}{3}$$

$$\boxed{(-\frac{1}{3}, -2)}$$

$$5. \begin{cases} -2x + 10y = 2 \\ 5x - 25y = 3 \end{cases}$$

$$5x - 25y = 3$$

$$-10x + 50y = 10$$

$$10 - 50y = 6$$

$$0 = 16$$

no solution

$$6. \begin{cases} 2x + 3y = 20 \\ 7x + 2y = 53 \end{cases}$$

$$7x + 2y = 53$$

$$4x + 6y = 40$$

$$-21x - 6y = -159$$

$$-17x = -119$$

$$x = 7$$

$$\boxed{(7, 2)}$$

$$2(7) + 3y = 20$$

$$14 + 3y = 20$$

$$3y = 6$$

$$y = 2$$

# System of Equations finding intersection of 2 lines

3 possibilities

no

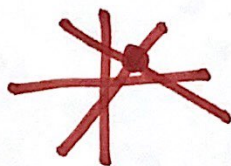


parallel

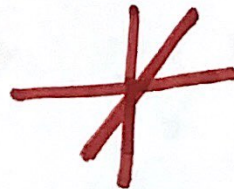
$$c \neq d$$

$$0=1 \text{ or } 2=8$$

one



infinite

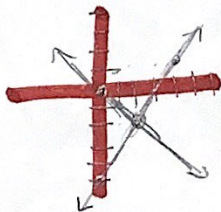


same line

$$0=0$$

3 methods

graphing



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

$$y = -x$$

$(2, -2)$

elimination

$$\begin{array}{r} -2(3x + 7y = 5) - 2 \\ \hline 6x + 11y = 22 \end{array}$$

$$6x + 11y = 22$$

$$\begin{array}{r} -6x + 14y = -10 \\ \hline 3y = 12 \end{array}$$

$$3y = 12$$

$$y = 4$$

addition

$$3x + 7(4) = 5$$

$$2x + 28 = 5$$

$$3x = -23$$

$$x = -\frac{23}{3}$$

$(-\frac{23}{3}, 4)$

substitution

$$\frac{1}{2}x + 3y = 9$$

$$2x + 12y = 36$$

$$\frac{1}{2}x + 3y = 9$$

$$3y = -\frac{1}{2}x + 9$$

$$y = -\frac{1}{6}x + 3$$

$$2x + 12(-\frac{1}{6}x + 3) = 36$$

$$2x - 2x + 36 = 36$$

$$0 = 0$$

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