

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Systems of Equations Reference

Use the selected sections to compare three methods for solving a system.

What is a system of equations?

A solution is an ordered pair that satisfies both equations at the same time.

Choose substitution when a variable is easy to isolate, elimination when coefficients cancel easily, or graphing when both lines can be plotted clearly.

Substitution

Isolate one variable, replace it in the other equation, solve, and then back-substitute.

Check the ordered pair in both original equations.

1 $2x + y = 7$

2 $x - y = 2$

Isolate a variable

$$y = -2x + 7$$

Substitute into the other equation

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

Solve the one-variable equation

$$3x - 7 = 2$$

Solve the one-variable equation

$$x = 3$$

Back-substitute

$$y = -2 \times (3) + 7 = 1$$

Solution

$$(3, 1)$$

Check both original equations

$$2 \times (3) + (1) = 7$$

$$(3) - (1) = 2$$

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Elimination

Multiply one or both equations so one variable has opposite coefficients. Add, solve, and back-substitute.

Scaling an equation does not change its line or its solutions.

1 $3x + 2y = 16$

2 $2x - 3y = 2$

Multiply the equations

$$2 \times (3x + 2y = 16) = 6x + 4y = 32$$

Multiply the equations

$$-3 \times (2x - 3y = 2) = -6x + 9y = -6$$

Add the equations

$$13y = 26$$

Solve the one-variable equation

$$y = 2$$

Back-substitute

$$x = -\frac{2}{3} \times (2) + \frac{16}{3} = 4$$

Solution

$$(4, 2)$$

Check both original equations

$$3 \times (4) + 2 \times (2) = 16$$

$$2 \times (4) - 3 \times (2) = 2$$

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Graphing

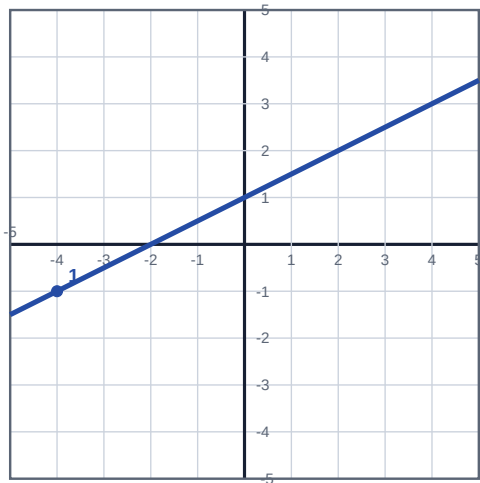
Graph one equation first, then add the second line to the same coordinate plane.

The intersection satisfies both equations and is the solution.

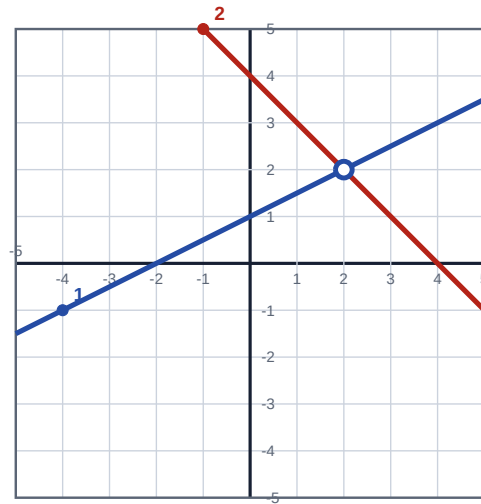
1 $y = \frac{1}{2}x + 1$

2 $y = -x + 4$

Graph the first equation



Graph both equations



Intersection: (2, 2)