Solving Systems of Equations

111003

Question:

Write a paragraph for each method of solving systems of equations:

- Graphing
- Substitution
- Elimination

Graph on a single coordinate plane.

$\boxed{x + \frac{1}{2}y = 5}$ $\boxed{3y - 2x = 6}$

$-x \quad -x$

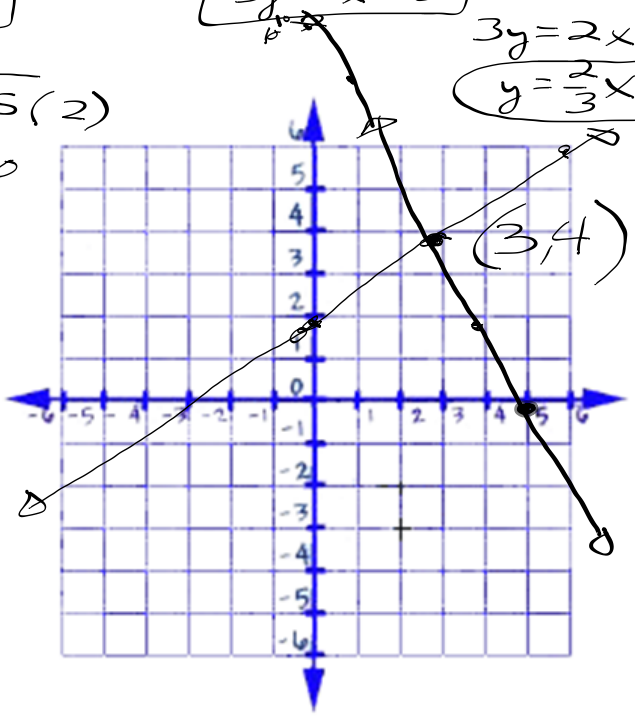
$(2)\ \frac{1}{2}y = -x + 5\ (2)$

$y = -2x + 10$

$-2 = \frac{-2}{1} = \frac{2}{-1}$

$3y = 2x + 6$

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



$$3y - 2x = 6$$
$$+2x \quad +2x$$
$$\frac{1}{3} \cdot (3y) = (2x + 6) \cdot \frac{1}{3}$$
$$y = \frac{2}{3}x + 2$$

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

$$2\left(\frac{1}{2}y\right) = (x)2$$
$$y = 2x$$

Solve $3y - 2x = 6$ for x

System of Equations

Two or more equations with the same variables.

For example:

$$x + \tfrac{1}{2}y = 5$$

(x, y) $\quad 3y - 2x = 6$

When are both of these equations true?

$x + \tfrac{1}{2}y = 5$ $\quad (x, y) = (3, 4)$

$3y - 2x = 6$ $\quad x + \tfrac{1}{2}y = 5$

$3(4) - 2(3) = 6$ $\quad 3 + \tfrac{1}{2}(4) = 5$

$12 - 6 = 6$ $\quad 3 + 2 = 5$

$6 = 6$ $\quad 5 = 5$

Solving Systems of Equations:

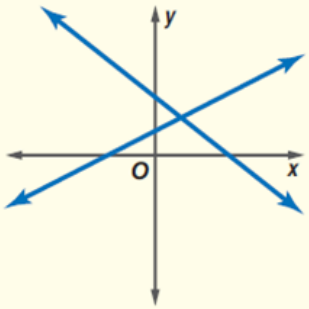
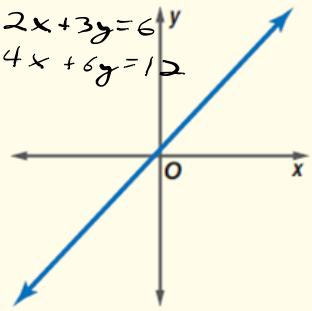
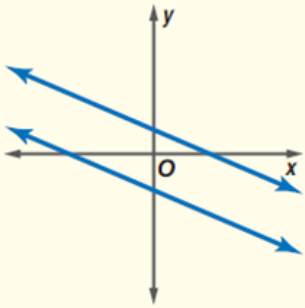
Method 1: Graphing

Step 1. Graph the equations

Step 2. See where they intersect

Step 3. Check the point to make sure

Concept Summary *Systems of Equations*

consistent and independent	consistent and dependent	inconsistent
	$2x+3y=6$ $4x+6y=12$ 	
intersecting lines; one solution	same line; infinitely many solutions	parallel lines; no solution

Notes. Solving Systems of Equations method 2.

Substitution

Step 1. Solve one of the equations for one of the variables.

Step 2. Put that into the other equation

Step 3. Plug the value you found into one of the equations.

$x + \frac{1}{2}y = 5$

$3y - 2x = 6$

$-3y \qquad -3y$

$\frac{1}{2}\cdot(-2x) = (-3y + 6)\frac{1}{2}$

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

$\boxed{\text{Step 1.}}$ $x = \frac{3}{2}y - 3$

$(\frac{3}{2}y - 3) + \frac{1}{2}y = 5$

$\boxed{\text{Step 2}}$ $\frac{4}{2}y - 3 = 5$

$2y = 8$

$y = 4$

$= 6\cdot\frac{1}{2}$

$= \frac{6}{1}\cdot\frac{1}{2}$

$= \frac{6}{2} = 3$

$x + \frac{1}{2}y = 5$

$3y - 2x = 6$

$\boxed{y = 4}$

$3\cdot(4) - 2x = 6$

$12 - 2x = 6$

$-12 \qquad -12$

$\frac{-2x}{-2} = \frac{-6}{-2}$ Divide by -2

$\boxed{x = 3}$

$\boxed{(3, 4)}$

Simplify.

$$\frac{3}{8}(16x-8)+\frac{2}{3}(15y+12)$$

$$\frac{3}{8}\cdot\frac{16x}{1}-\frac{3}{8}\cdot\frac{8}{1}+\frac{2}{3}\cdot\frac{15y}{1}+\frac{2}{3}\cdot\frac{12}{1}$$

$$6x-3+10y+8$$

$$6x+10y+(-3)+8$$

$$6x+10y+5$$

FBRTI

Notes. Elimination Continue on 3.1/3.2

Ex 1. Solve the system of equations

$-2(x+y=7) \longrightarrow -2x-2y=-14$

$1(2x+y=11) \longrightarrow 2x+y=11$

$+$

$0x-y=-3$

$-y=-3$

$y=3$

$x+y=7$

$x+3=7$

$-3\quad-3$

$x=4$

$1(x+y=7) \longrightarrow x+y=7$

$-1(2x+y=11) \longrightarrow -2x-y=-11$

$-x=-4$

$x=4$

$2(4)+y=11$

$8+y=11$

$y=3$

$$\begin{aligned} 3(3x + 4y &= 28) \rightarrow 9x + 12y = 84 \\ 4(5x - 3y &= -21) \rightarrow 20x - 12y = -84 \end{aligned}$$

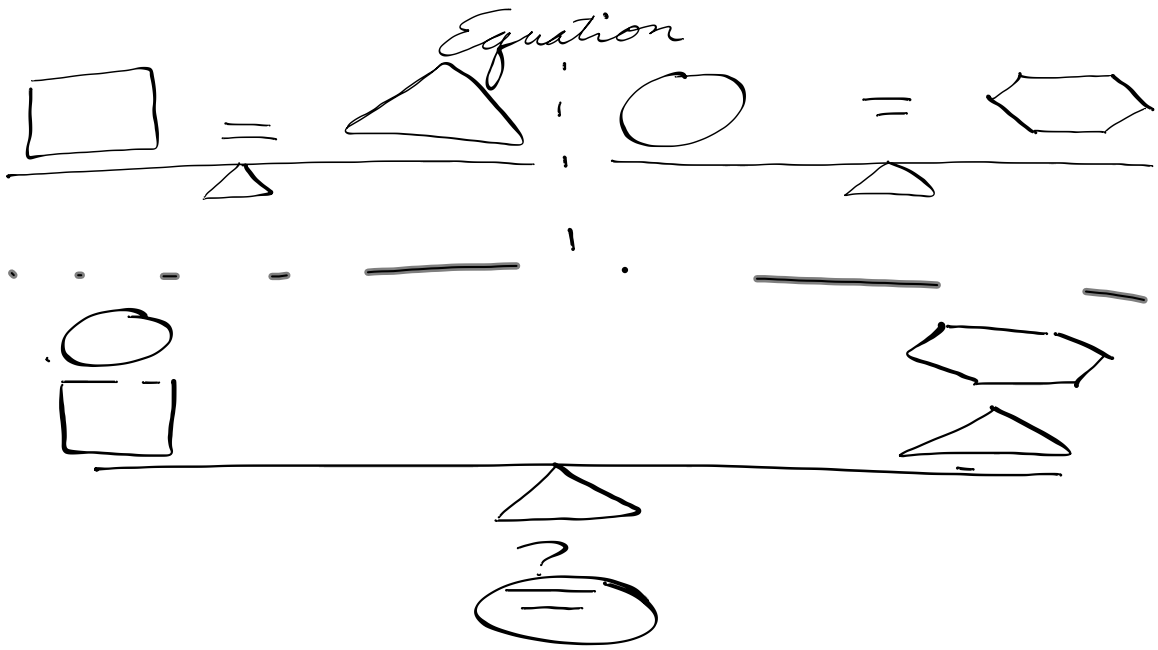
$$+ \quad 29x = 0$$

$$x = 0$$

$$5(0) - 3y = -21$$

$$\frac{-3y}{-3} = \frac{-21}{-3}$$

$$y = 7$$



$3\left(\frac{5}{2}x + \frac{1}{3}y = 13\right) \longrightarrow \frac{15}{2}x + y = 39$

$1\left(\frac{1}{2}x - y = -7\right) \longrightarrow \frac{1}{2}x - y = -7$

$+$

$\frac{16}{2}x = 32$

$8x = 32$

$x = 4$

$\frac{1}{2}(4) - y = -7$

$2 - y = -7$

$y = 9$

Due 111006 / 111007

Homework

Extra Practice pg 832

3.1 #7-12 all

3.2 #1-9 all

For a grade $\longrightarrow$ 15