

December 7th

Due Today: **hw 5.4**

## Unit 5: Linear Systems

## Lesson 5.5: Algebraically Solving Systems: ELIMINATION

**Check your answers to HW 5.4:**

1)  $(-2, -2)$   
5)  $(6, 2)$

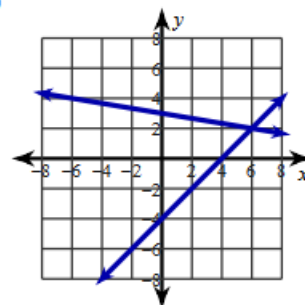
2)  $(-4, 1)$

3)  $(0, 4)$

4)  $(1, 2)$

6)  $y = x - 4$ ,  $y = -\frac{1}{6}x + 3$

7)



(3)

$$-4x - 3y = -12, \quad 4x + 6y = 24$$

$$\begin{array}{r} +4x \qquad \qquad +4x \\ \hline -3y = 4x - 12 \\ -3 \qquad \qquad -3 \end{array}$$

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

$$4x + 6\left(-\frac{4}{3}x + 4\right) = 24$$

$$4x - 8x + 24 = 24$$

$$\begin{array}{r} -4x + 24 = 24 \\ \hline -4x + 24 = 24 \\ -24 \quad -24 \end{array}$$

$$\begin{array}{r} -4x = 0 \\ \hline -4 \quad -4 \end{array}$$

$$x = 0$$

$$y = -\frac{4}{3}(0) + 4$$

$$= 0 + 4$$

$$y = 4$$

$$x = 0, y = 4 \quad \star$$

**Solving a system with ELIMINATION:**

**using addition/subtraction of equations to *eliminate* one variable**

**example 1:** use subtraction when 2 coefficients are EQUAL

$$\begin{array}{r} -2x + 3y = 4 \\ - \quad +6x + 3y = 24 \\ \hline \end{array}$$

$\Delta x = \frac{28}{1}$

$x = 7$

$$\begin{array}{r} -2(7) + 3y = 4 \\ -14 + 3y = 4 \\ +14 \quad +14 \\ \hline \end{array}$$

$$\begin{array}{r} 3y = 18 \\ \frac{3}{3} \quad \frac{18}{3} \\ \hline y = 6 \end{array}$$

$x = 7, y = 6$

**example 2:** use addition when 2 coefficients are OPPOSITE

$$\begin{array}{r} 2x + 4y = 0 \\ + \quad -2x - y = 6 \\ \hline \end{array}$$

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

$-2x - 2 = 6$   
 $+2 \quad +2$   
 $\hline -2x = 8$   
 $-2 \quad -2$   
 $x = -4$

$x = -4, y = 2$

**example 3:** use multiplication + add/sub when 1 equation is a multiple of the other.

$$\begin{array}{l}
 (-6x + 4y = 2)^3 = -18x + 12y = 6 \\
 \begin{array}{r}
 -8x + 12y = -4 \\
 -18x + 12y = 6
 \end{array} \\
 \hline
 10x = -10 \\
 \frac{10x}{10} = \frac{-10}{10} \\
 x = -1
 \end{array}$$

$-8(-1) + 12y = -4$   
 $8 + 12y = -4$   
 $\begin{array}{r} 8 + 12y = -4 \\ -8 \phantom{+ 12y} \\ \hline 12y = -12 \\ \frac{12y}{12} = \frac{-12}{12} \\ y = -1 \end{array}$

$x = -1, y = -1$

**example 4:** multiply BOTH equations if needed

$$\begin{array}{r} (-5x + 5y = -5) \cdot 3 \\ (4x - 3y = 9) \cdot 5 \end{array}$$

$$\begin{array}{r} -15x + 15y = -15 \\ + \quad 20x - 15y = 45 \end{array}$$

$$\frac{5x}{5} = \frac{30}{5}$$

$$x = 6$$

$$20(6) - 15y = 45$$

$$\begin{array}{r} 120 - 15y = 45 \\ -120 \quad -120 \end{array}$$

$$\begin{array}{r} -15y = -75 \\ \frac{-15}{-15} \quad \frac{-75}{-15} \end{array}$$

$$y = 5$$

$$x = 6, y = 5$$

**Practice:** solve all of the following systems using ELIMINATION

$$\begin{aligned} 1) \quad & -x - 3y = 1 \\ & -x + 7y = 11 \end{aligned}$$

*2x #1*

$$\begin{aligned} 2) \quad & 4x + 3y = 6 \\ & -2x + 3y = -30 \end{aligned}$$

$$\begin{aligned} 3) \quad & 4x + 5y = -12 \\ & 3x - 5y = -9 \end{aligned}$$

*#2*

$$\begin{aligned} 4) \quad & 2x + 2y = -18 \\ & -2x - y = 19 \end{aligned}$$

$$\begin{aligned} 5) \quad & 6x + 4y = -16 \\ & 2x - y = 4 \end{aligned}$$

*#3*

$$\begin{aligned} 6) \quad & 8x + 12y = 16 \\ & 7x + 6y = -4 \end{aligned}$$

$$\begin{aligned} 7) \quad & -8x + 3y = 17 \\ & -7x + 5y = 22 \end{aligned}$$

*#4*

$$\begin{aligned} 8) \quad & 5x - 3y = 16 \\ & -3x + 5y = 0 \end{aligned}$$

## Unit 5: LINEAR SYSTEMS

| Lesson # | Name                                           | Recap | HW                             |
|----------|------------------------------------------------|-------|--------------------------------|
| 5.1      | Graphically Solving Systems                    |       | Video 5.1<br>NOTES<br>HW 5.1   |
| 5.2      | More Graphing Systems                          |       | HW 5.2<br>quiz tomorrow!       |
| 5.3      | Quiz + Calc. systems                           |       | 5.3 Delta Math                 |
| 5.4      | Algebraically Solving Systems-<br>SUBSTITUTION |       | 5.4 hw<br>* unit 4 corrections |
| 5.5      | Algebraic Solutions-<br>ELIMINATION            |       | HW 5.5                         |