Solving Systems by Graphing

Agenda

Warm-Up

HW Check

Notes p. 55

HW: #1-9

Reminders

Quiz & HW 3.1 due TMR!!!

Essential Question
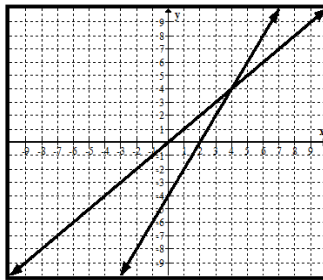
How do I use my calculator to graph systems of equations?
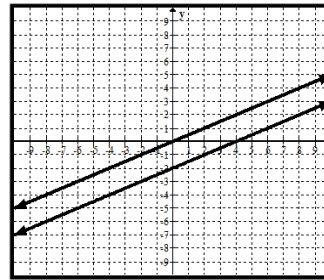
You need a calculator today, too!

Warm-Up Thursday

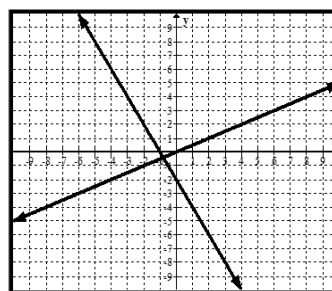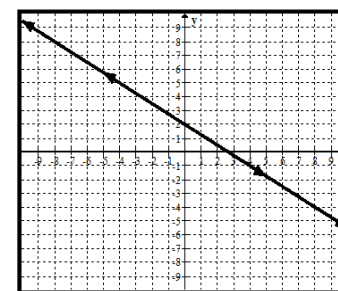1. Which of the following models a system of equations with no solution? How do you know?

A

B

C

D

Algebra I - Unit 4: Solving Systems by Elimination Day 2 _____
Practice – Solving Systems by Elimination Day 2
Name _____ Date_____ Period _____

Solve each system by elimination.

1. $5x - 2y = 4$
   $3x + y = 9$

2. $3x - 5y = 7$
   $5x - 2y = -1$, then x + y = ?

3. $3x - 5y = 13$
   $x - 2y = 5$

4. $4x + 3y = 9$
   $3x + 4y = 12$, then xy = ?

5. $3x - 2y = -1$
   $3x - 4y = 9$

6. $4x + 6y = 0$
   $6x + 8y = 2$, then x – y = ?

7. Karrie and Amy were shoulder partners. They both worked the same problem, but got two different answers. Who is incorrect and explain the error they made?

Karrie:
$x + y = -3$ ⟶ $x + y = -3$
$3x + y = 3$ ⟶ $-(3x + y = 3)$
$\overline{}$
$-2x = 0$
$x = 0$

When she solved for x, Karrie got $x = 0$

Amy:
$x + y = -3$ ⟶ $x + y = -3$
$3x + y = 3$ ⟶ $-(3x + y = 3)$
$\overline{}$
$-2x = -6$
$x = 3$

When she solved for x, Amy got x= 3

$$\begin{bmatrix} 1 & \frac{-1}{2} \\ 2 & 2 \end{bmatrix}^{-1} \begin{bmatrix} 0 \\ 180 \end{bmatrix}$$

[3]

width = 30 ft
length = 60 ft

$$\begin{bmatrix} 30 \\ 60 \end{bmatrix}$$

$w = \frac{1}{2}L$

$\frac{1}{2}L \quad -\frac{1}{2}L$

$w - \frac{1}{2}L = 0$

Unit 4: Solving Systems by Elimination Day 2

...m, state the best method to use and use that method to solve.

...of a rectangular volleyball court is 180 feet. The court's width, w, is half its length, l. Determine the dimensions, in feet, of the volleyball court.

Let w be width.
Let L be length.

$2L + 2w = 180$

$w = \frac{1}{2}L$

$$\begin{bmatrix} 1 & -1/2 \\ 2 & 2 \end{bmatrix}^{-1} \begin{bmatrix} 0 \\ 180 \end{bmatrix}$$

$w - \frac{1}{2}L = 0$

$2w + 2L = 180$

9. At Candy's Sweet Shop, Sarah made *c* pounds of chocolate-covered raisins, which sell for $1.50 a pound, and *y* pounds of yogurt-covered raisins, which sell for $1.20 a pound. Sarah wants to make 40 pounds of a mixture of the two kinds of raisins that sells for $1.35 a pound. How many pounds of each kind of raisin is needed to produce the mixture?

10. Three hundred fifty-eight tickets were sold to the school basketball game on Friday. Student tickets were $1.50 and non-student tickets were $3.25. The school made $752.25. How many student and non-student tickets were sold?

11. Carl bought 19 apples of 2 different varieties to make a pie. The total cost of the apples was $5.10. Granny Smith apples cost $0.25 each and Gala apples cost $0.30 each. How many of each type of apple did Carl buy?

Let S be Granny Smith.
Let G be Gala.

$0.25S + 0.30G = 5.10$

$S + G = 19$

$$\begin{bmatrix} 0.25 & 0.30 \\ 1 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 5.10 \\ 19 \end{bmatrix}$$

S = top
G = bottom

Solving Systems by Graphing p.55

Essential Question How do I use my calculator to graph systems of equations?

A SOLUTION to a system of equations is where lines intersect.

Does a system of equations always have a solution? Why or why not?

NO, lines could be parallel.

Solving Systems by Graphing p.55

Essential Question How do I use my calculator to graph systems of equations?

Using The Calculator:

To solve a system of equations by graphing using the calculator: *Solve for y=*

- both equations need to be in slope-intercept form, $y = mx + b$
- Enter each equation into $y =$ on your calculator.
- **Press Graph.**
  - Can you see where the two lines intersect in your viewing window? If not, use your knowledge of domain and range to set a good viewing window.
- Press **2nd TRACE, then 5,** intersection.
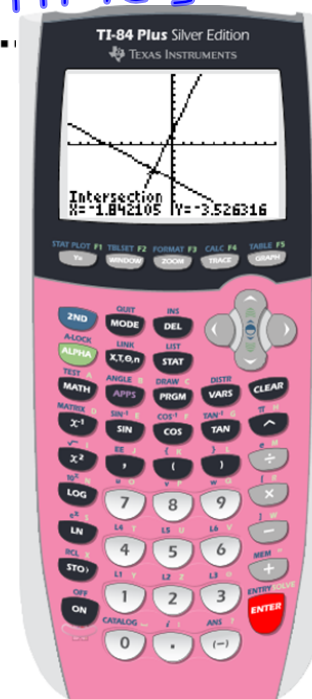- Follow the directions on the screen *Enter 3 times*

ex

```
Plot1  Plot2  Plot3
\Y1■.8X-5
\Y2■3X+2
\Y3=
\Y4=
\Y5=
\Y6=
\Y7=
```

```
CALCULATE
1:value
2:zero
3:minimum
4:maximum
5:intersect
6:dy/dx
7:∫f(x)dx
```

TI-84 Plus Silver Edition
TEXAS INSTRUMENTS

```
Intersection
X=-1.842105  Y=-3.526316
```

Solving Systems by Graphing p.55

Essential Question   How do I use my calculator to graph systems of equations?
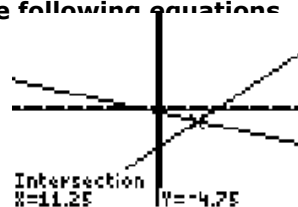
Find the solution set to the following equations. If there is not a solution, write No Solution.

1. $y_1 = x - 16$

$y + \dfrac{1}{3}x = -1$

$-\dfrac{1}{3}x \quad \bigg| \quad -\dfrac{1}{3}x$

$y_2 = -\dfrac{1}{3}x - 1$

Intersection
X=11.25   Y=-4.75

$(11.25, -4.75)$

2. $y_1 = 4.7x + 2.1$

$y - 1.6x = -5.34$

Plot1 Plot2 Plot3
\Y₁ ▪4.7X+2.1
\Y₂ ▪1.6X-5.34▪
\Y₃=
\Y₄=
\Y₅=

$(-2.4, -9.18)$

3. $4x - 2y = 4$

$2y = 4x$

4. $x + 2y = 4$

$2x + y = 5$

$\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}^{-1} \begin{bmatrix} 4 \\ 5 \end{bmatrix}$

$(2, 1)$

5. $3x - y = 2$

$12x - 4y = 8$

Solving Systems by Graphing p.55

| **Essential Question** | How do I use my calculator to graph systems of equations? |

6. What is the *x*-coordinate of the solution to the system of linear equations below?

   (round to the nearest thousandth)

$$4.8x + 0.6y = 4$$
$$3.2x + y = 2.7$$

Solving Systems by Graphing p.55

Essential Question How do I use my calculator to graph systems of equations?

7. The RHS soccer team is selling hats as a fundraiser. They contacted two companies. (Hats Off charges a $50 design fee and $5 per hat.) Top Stuff charges a $25 design fee and $6 per hat.

slope

A) Write a system of equations that represents each company's pricing.

Let Statements

✓ Let cost be c.

✓ Let hats be h.

Hats Off $c = 50 + 5h$

Top Stuff $c = 25 + 6h$

B) For how many hats will the cost be the same? What is the cost?

$Y_1 = 50 + 5X$

$Y_2 = 25 + 6X$

X	Y1	Y2
19	145	139
20	150	145
21	155	151
22	160	157
23	165	163
24	170	169
25	175	175

X=25

25 hats
$175

C) Explain when it is cheaper for the soccer team to use Top Stuff and when it is cheaper to use Hats Off.
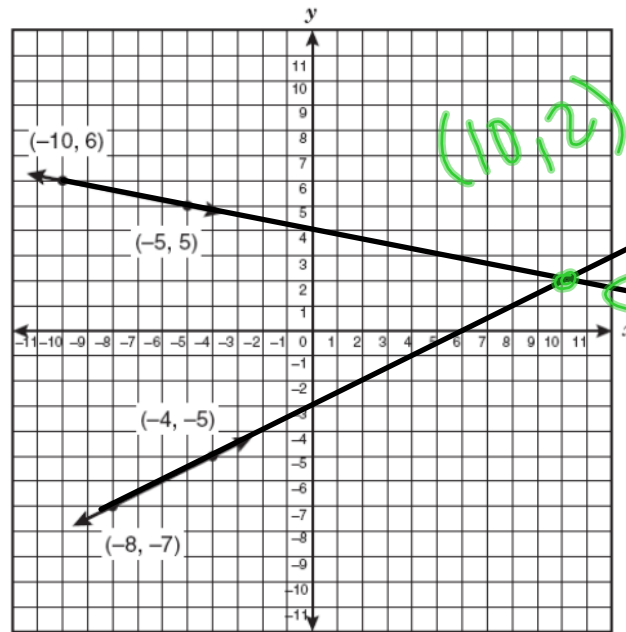
Solving Systems by Graphing p.55

Essential Question How do I use my calculator to graph systems of equations?

8. The graph of a system of linear equations is shown below.

Which of the following is the solution to this system of linear equations?

A. (0, 4)
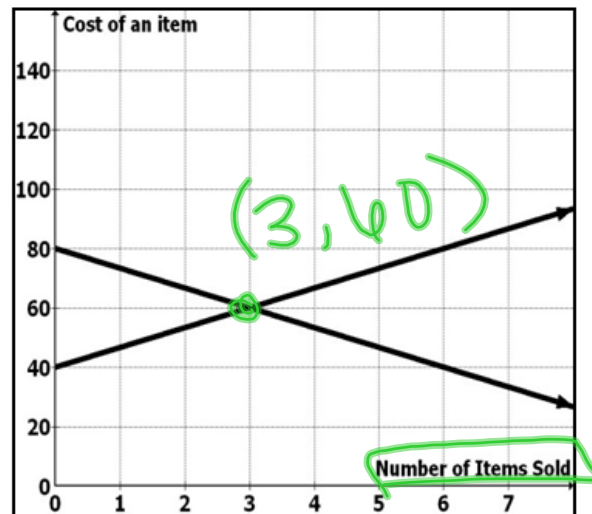B. (8, 1)
C. (0, -3)
D. (10, 2)

(10, 2)

extend lines w/ straight edge

Solving Systems by Graphing p.55

Essential Question How do I use my calculator to graph systems of equations?

9. An economic model predicts that the supply and the demand for a new product can be estimated using the lines on the graph below. Based on this graph, how many items must be sold in order for the supply and demand to be equal?
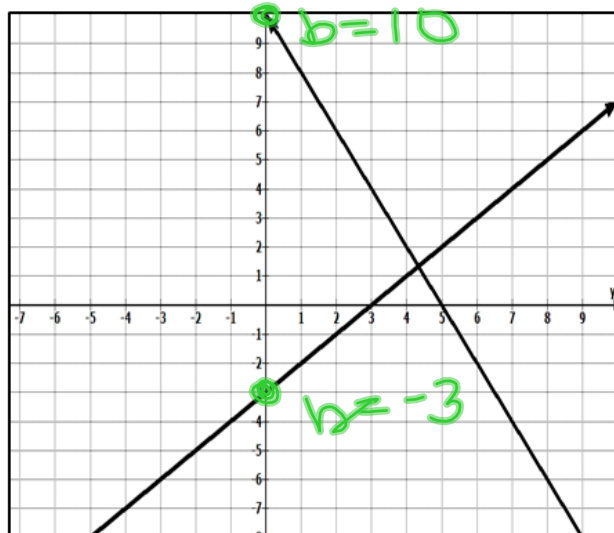
3 items

(3, 60)

Cost of an item

140	
120	
100	
80	
60	
40	
20	
0	0 1 2 3 4 5 6 7

Number of Items Sold

Solving Systems by Graphing p.55

Essential Question   How do I use my calculator to graph systems of equations?

10. The following graph shows the solution to a system of equations.

b=10

b= -3

Which system of equations is best represented by the graph above?

Which system of equations is best represented by the graph above?

F $y = -x + 3$
   $y = 2x - 10$

G $y = x - 3$
   $y = -2x$

H $y = x - 3$
   $y = -2x + 10$

J $y = 2x - 3$
   $y = x + 10$

Algebra I - Unit 4 – Solving Systems by Graphing
Practice - Solving Systems by Graphing
Name _____Date_____Period_____

Solve each system of equations below. You must solve for y to use your calculator!

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

    $y = -x - 4$

2. $y = -2x + 1$

    $y = x - 5$

3. $y = \frac{5}{4}x - \frac{1}{2}$

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

4. $y = 6.9x + 12.4$

    $3.2x + y = 52.8$

5. $x + y = 0$

    $3x + y = -4$

6. $2x - y = -1$

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

7. Shelby solved the following system of equations and reported that $x = 4$ and $y = 6$. Solve the system of equations by graphing. Is she correct? Why or why not. Use the table to justify your answer.

$y - x = 2$
$4y = 8x - 8$

x	y_1	y_2

8. Coach Sureshot needs to hire an electrician to do some repair work at his new home. A-1 Electricians charge $30 for a service call plus $45 per hour while Excellent Electricians charge $40 per hour plus a $55 service call.

   A) What equation could represent the cost for hiring A-1 Electricians? _____
   B) What equation could represent the cost for hiring Excellent Electricians? _____

   If the electricians only work for 2 hours, how much will each company charge him?
   C) A-1 Electricians will charge _____
   D) Excellent Electricians will charge _____

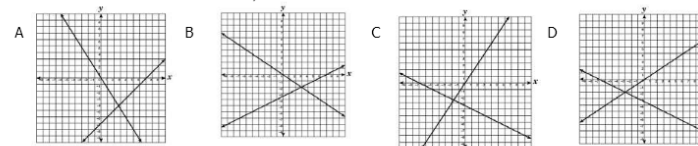   If the electricians have to work for 8 hours, how much will each company charge Coach Sureshot?
   E) A-1 Electricians will charge _____
   F) Excellent Electricians will charge _____

   When will both companies charge the same amount?
   G) For _____ hours, both companies would charge _____.

9. Which graph best represents a solution to this system of equations?

$2x - 3y = 0$
$x + 2y = -7$

A   B   C   D

HW Help Graphing Systems

No work = no credit = no kidding!

Show me what you typed into the calculator!!!

1.

Intersection
X=-1.8   Y=-2.2
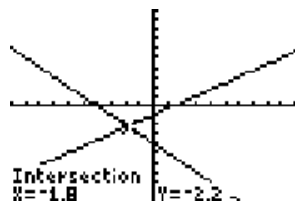
2. You try!

3.
Plot1 Plot2 Plot3
$\backslash Y_1 = \frac{5}{4}X - \frac{1}{2}$
$\backslash Y_2 = \frac{-3}{4}X + 2$
$\backslash Y_3 =$
$\backslash Y_4 =$

4. You try!

5.
Plot1 Plot2 Plot3
$\backslash Y_1 = -X$
$\backslash Y_2 = -3X - 4$
$\backslash Y_3 =$
$\backslash Y_4 =$
$\backslash Y_5 =$
$\backslash Y_6 =$
$\backslash Y_7 =$

6. You try!

7. Solve both equations for y and check the table...does y1=y2 at x=4?

8. A) y=30+45x B) y=55+40x

For parts C-G, use the table in the calculator! x is time (hours) and y is charge (money)

9. Solve both equations for y. Which picture matches?