

Algebra 1: Problem Set 7A

Mr. Chamberlain

SELECTED ANSWERS

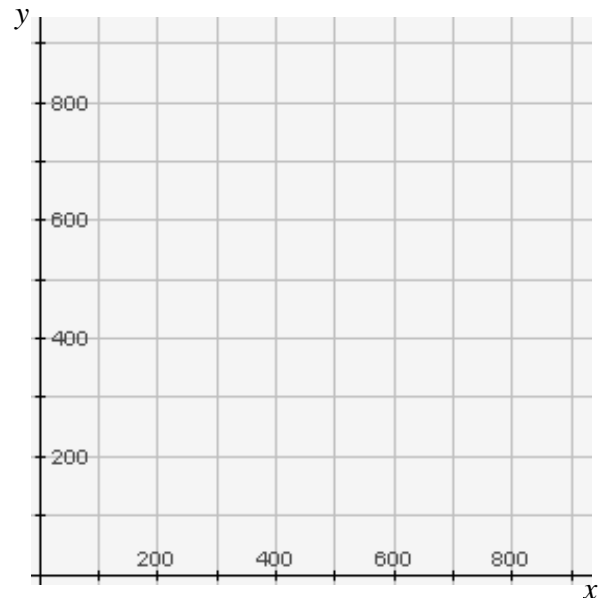
(see #4 a-d)

1. Last Friday night, \$1875 was paid at the gate of the high school football game. Student tickets were sold for \$3.00 and adult tickets for \$5.00. A total of 535 fans (students and adults combined) attended the game. Use the x for the number of students and the y for the number of adults.

You work below will answer two questions: 1) How many students attended the game?
2) How many adults attended the game?

Write an equation to represent the amount of money paid at the gate in terms of x and y .

Write a second equation to represent the number of student and adult fans in attendance.



Graph both equations in the coordinate plane provided.

What does the point of intersection mean in the context of this graph. Estimate the number of students and adults that attended the game.

2. Sometimes, you will need to find the ordered pairs that make two or more equations true. This is called *solving a system of equations*.

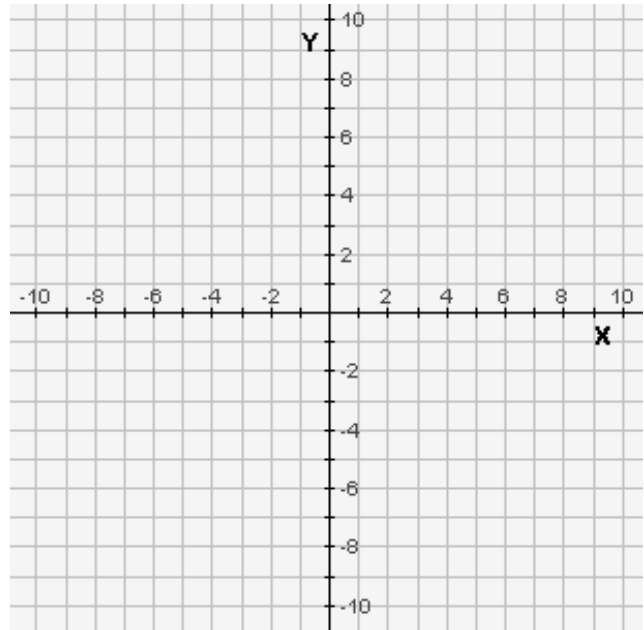
a) Graph each linear equation on the same coordinate plane.

$$\begin{cases} y = -2x + 5 \\ y = x - 1 \end{cases}$$

b) Locate the point where the two lines intersect and label it point **A**.

c) Write the coordinates of **A** here:

d) Substitute these x - and y - values into both equations to check your solution.



3. Consider what happens when two values are equal to a third value.

- a) If Chuck is the same age as John, Chuck is also the same age as Bob, what can you determine about John and Bob?
- b) Morristown High has twice as many students as Mendham High, and Morristown High also has twice as many students as West Morris High. What can you conclude about the student populations at Mendham and West Morris?
- c) So, if $y = -2x + 5$ and $y = x - 1$, what algebraic conclusion can you make about “ $-2x + 5$ ” and “ $x - 1$ ”? How can you use this information to find a solution (ordered pair) that satisfies both equations?

4. Use the algebraic substitution procedure above to find the coordinates of each point of intersection. Remember, you *can* perform substitution *without* solving both equations for “y=” form. The choice is yours.

Check your solution by substituting the ordered pair solution into **EACH** equation. Also, you should check your work on the web-based graphing calculator.

$$a) \begin{cases} y = -x - 8 \\ y = x - 2 \end{cases}$$

$$\begin{aligned} -x - 8 &= x - 2 &<\text{add } x \text{ to both sides}> \\ -8 &= 2x - 2 &<\text{add } 2 \text{ to both sides}> \\ -6 &= 2x &<\text{divide both sides by } 2> \\ x &= -3 \end{aligned}$$

Substitute the solution ($x = -3$) into one of the original equations (pick the “easier” one)...

$$\begin{aligned} y &= x - 2 \\ y &= (-3) - 2 \\ y &= -5 \end{aligned}$$

So, the solution is $(-3, -5)$

$$b) \begin{cases} y = -3x \\ 4x + y = 2 \end{cases}$$

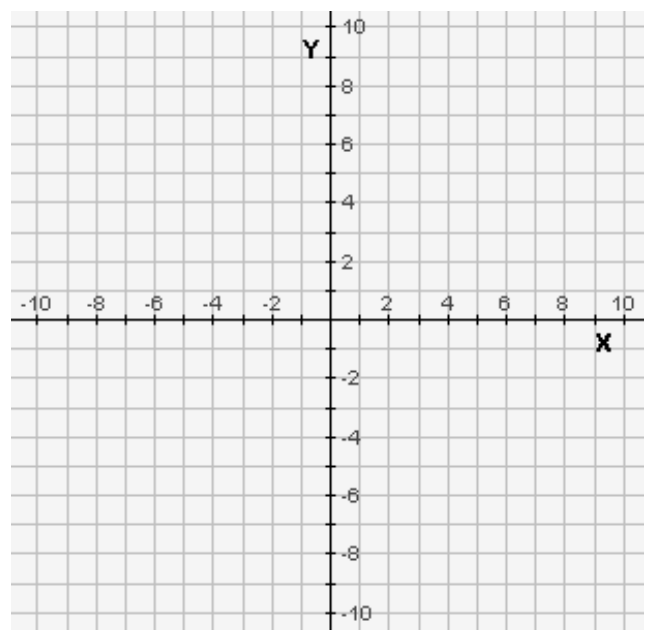
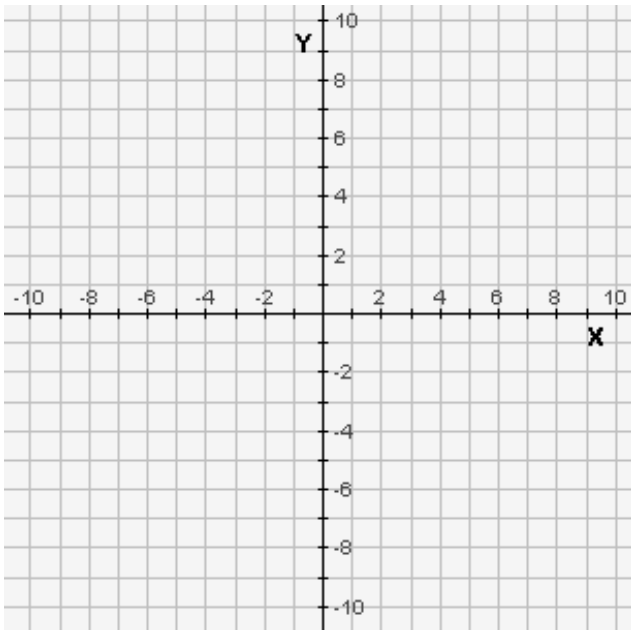
Substitution makes this VERY EASY. Since $y = -3x$ in the first equation, just substitute $-3x$ for y in the second equation...

$$\begin{aligned} 4x + (-3x) &= 2 \\ x &= 2 \end{aligned}$$

Now, substitute the solution into one of the original equations...

$$\begin{aligned} y &= -3x \\ y &= -3(2) \\ y &= -6 \end{aligned}$$

Solution $(2, -6)$



4.

c) $\begin{cases} y = -x + 3 \\ y = x + 3 \end{cases}$

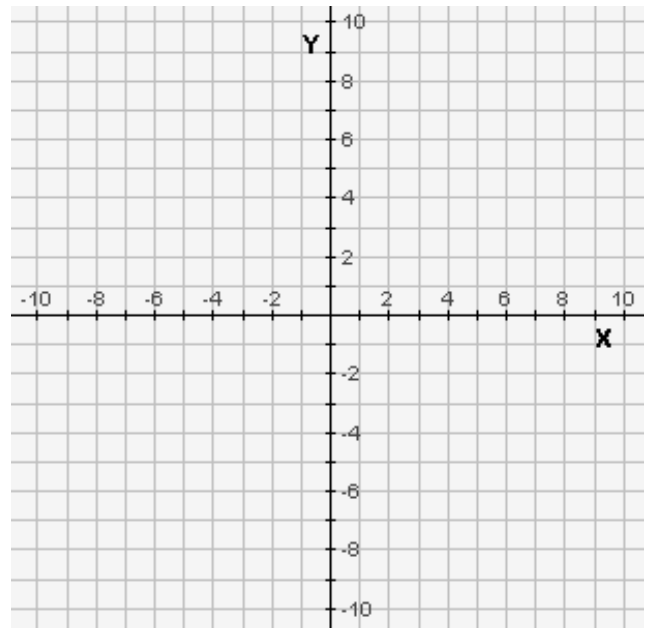
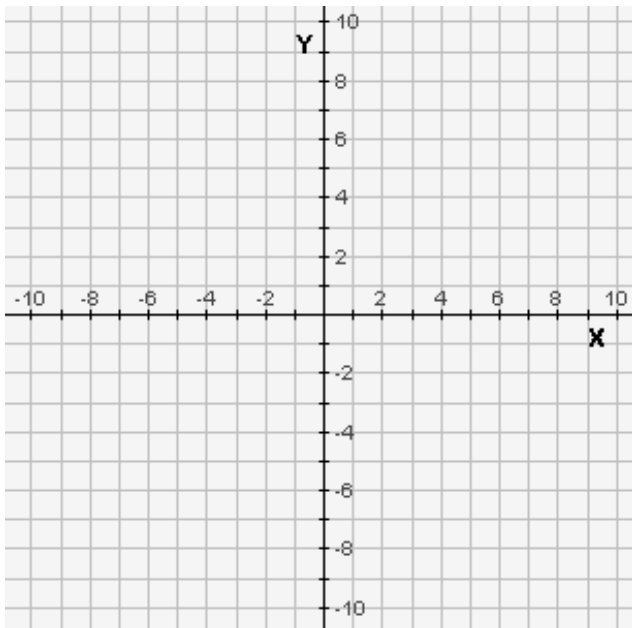
d) $\begin{cases} y = -x + 5 \\ x - 2y = -4 \end{cases}$

Solution (0, 3)

Hint: You could either:
1) Convert the second equation to slope-intercept form
or....

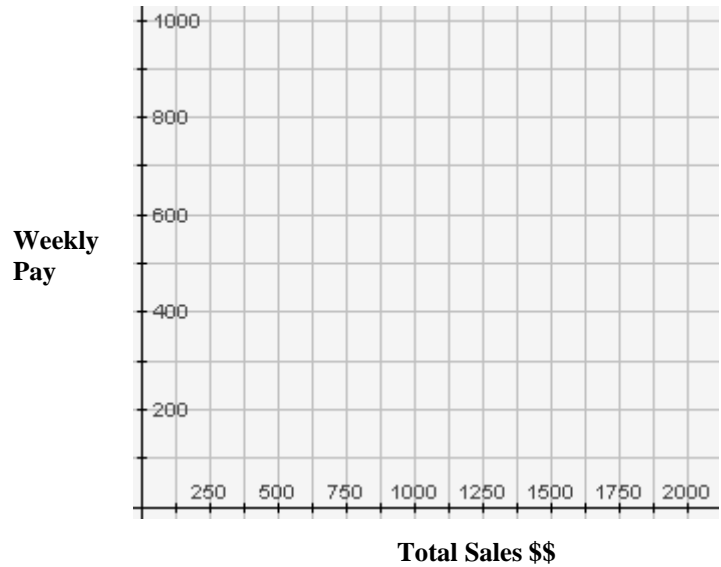
2) Substitute $(-x + 5)$ for y in the second equation.

Solution (2, 3)



5. Joyce is taking a job as a water-delivery person. She will have a choice of two weekly compensation (pay) plans. Plan One offers a base pay of \$200, plus a 40% commission on total sales. Plan Two offers a base pay of \$500 plus a 5% commission on total sales. Let x represent total sales and y the weekly pay.

- a) Write and graph equations in slope-intercept form to model her possible income for one week for up to \$2,000 in sales for both packages.



- b) What does the point of intersection represent?
- c) Explain the meaning of the graph to both the left and right side of the point of intersection.
- d) Which choice would you recommend for Joyce? Explain.