DOOR

Promethean Board

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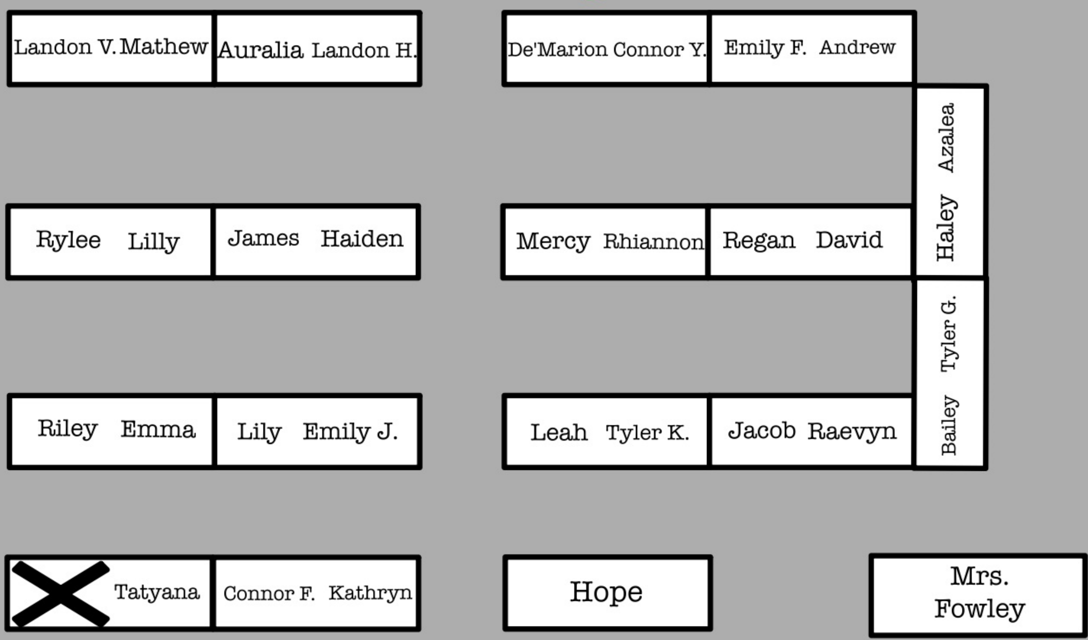
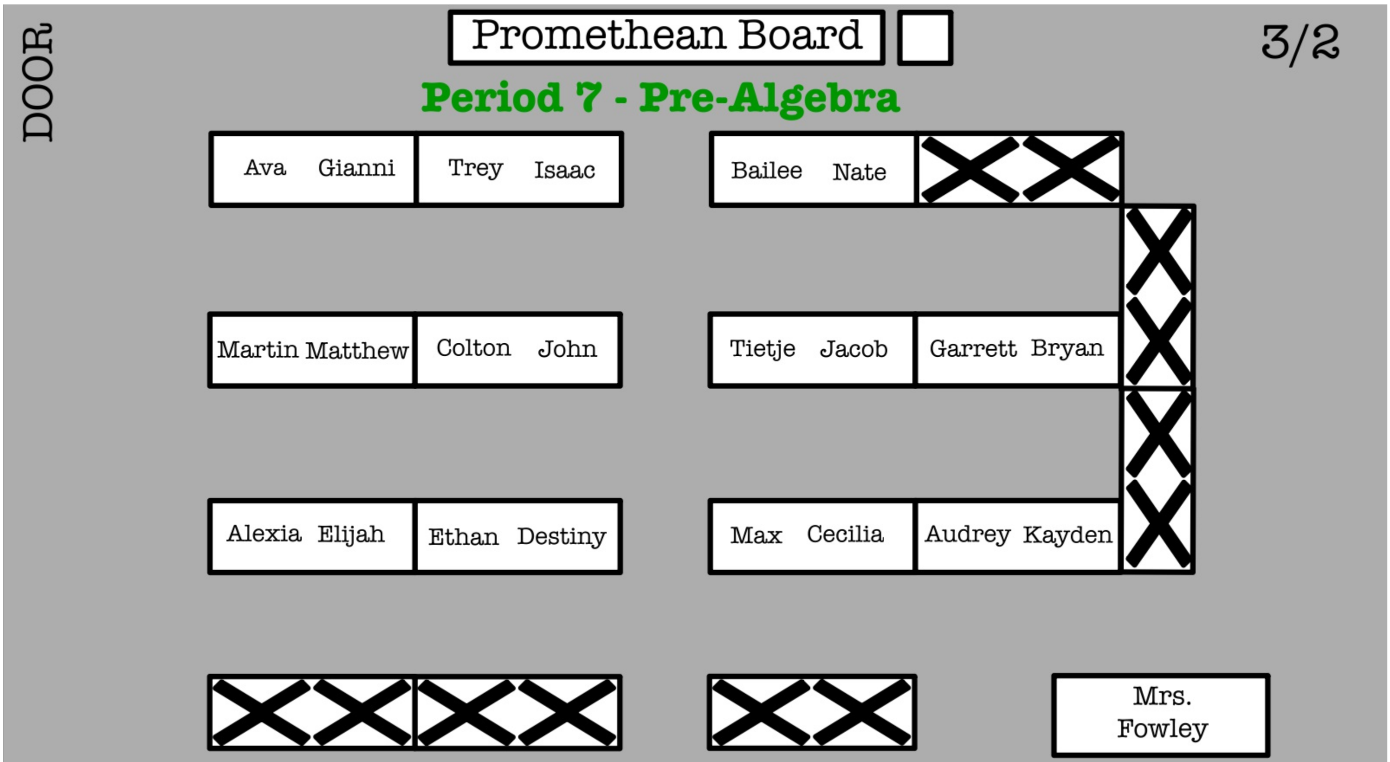
Period 2 - Pre-Algebra



1. Fill in planner
2. Check 8.7 Exercises
3. 8.8 notes discussion and Exercises Pp.434-435
4. Homework: More 8.8 Exercises and
   Pp.442-445 #6-26 evens



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8.7 Exercises #13, 15, 21, & 27 2/28

Let $f(x) = -3x + 1$ and $g(x) = 10x - 4$. Find the indicated value.

13. x when $f(x) = -17$ **6**

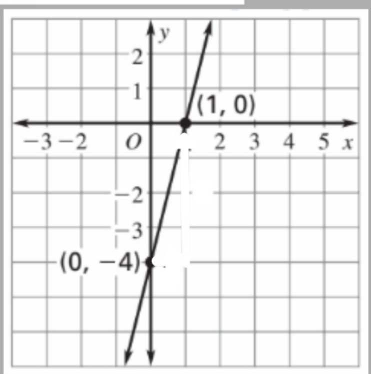
$$-17 = -3x + 1$$
$$-1 \qquad\qquad -1$$
$$-18 = -3x$$
$$\frac{-18}{-3} = \frac{-3x}{-3}$$
$$\boxed{6 = x}$$

15. $f(-20)$ **61**

$$f(-20) = -3(-20) + 1$$
$$= 60 + 1$$
$$= \boxed{61}$$

Graph the function.

21. $g(x) = 4x - 4$



Write a linear function that satisfies the given conditions.

27. $r(-9) = -7$, $r(0) = -1$ $r(x) = \frac{2}{3}x - 1$

$$(-9, -7) + (0, -1)$$

b

$$\frac{-1-(-7)}{0-(-9)} = \frac{6 \div 3}{9 \div 3} = \frac{2}{3} = m$$

$$\boxed{r(x) = \frac{2}{3}x - 1}$$

8.8 Systems and Linear Equations notes Pp.431-433 2/28

A **system of linear equations**, or simply a *linear system*, consists of two or more linear equations with the same variables. Below is an example.

$$y = 2x - 4 \quad \textbf{Equation 1}$$
$$y = -3x + 1 \quad \textbf{Equation 2}$$

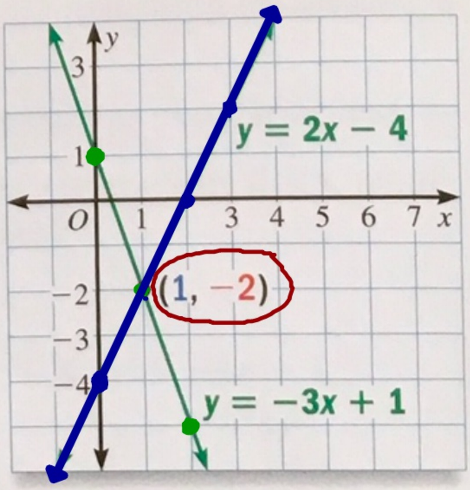
A **solution of a linear system** in two variables is an ordered pair that is a solution of each equation in the system. A linear system has a solution at each point where the graphs of the equations in the system intersect.

Example 1 *Solving a System of Linear Equations*

Solve the linear system: $y = 2x - 4$* **Equation 1**

$y = -3x + 1$* **Equation 2**

1. Graph the equations.
2. Identify the apparent intersection point, (1, −2).
3. Verify that (1, −2) is the solution of the system by substituting 1 for x and −2 for y in each equation.



Equation 1

$y = 2x - 4$

$-2 \stackrel{?}{=} 2(1) - 4$

$-2 = -2$ ✓

Equation 2

$y = -3x + 1$

$-2 \stackrel{?}{=} -3(1) + 1$

$-2 = -2$ ✓

Answer The solution is (1, −2).

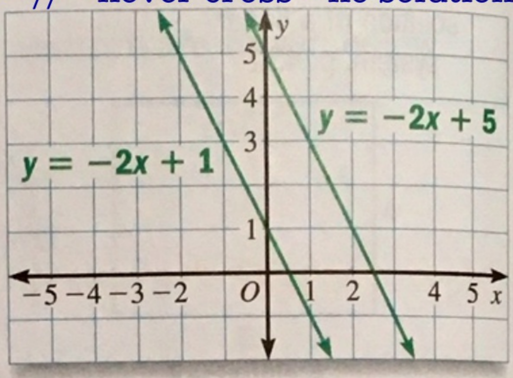
Numbers of Solutions As you saw in Example 1, when the graphs of two linear equations have exactly one point of intersection, the related system has exactly one solution. It is also possible for a linear system to have no solution or infinitely many solutions.

Example 2 *Solving a Linear System with No Solution*

Solve the linear system: $y = -2x + 1$ **Equation 1**

$y = -2x + 5$ **Equation 2**

- same slope = // = never cross = no solution



Graph the equations. The graphs appear to be parallel lines. You can confirm that the lines are parallel by observing from their equations that they have the same slope, -2, but different y-intercepts, 1 and 5.

Answer Because parallel lines do not intersect, the linear system has no solution.

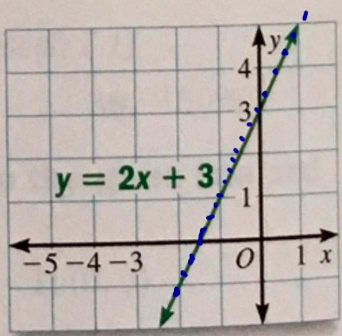
Example 3 *Solving a Linear System with Many Solutions*

Solve the linear system: $\mathbf{2x - y = -3}$ **Equation 1**

$\mathbf{-4x + 2y = 6}$ **Equation 2**

Write each equation in slope-intercept form.

Equation 1	**Equation 2**
$2x - y = -3$	$-4x + 2y = 6$
$\frac{-1y}{-1} = \frac{-2x - 3}{-1}$	$2y = 4x + 6$
$y = 2x + 3$	$y = 2x + 3$



The slope-intercept forms of equations 1 and 2 are identical, so the graphs of the equations are the same line (shown at the right).

Answer Because the graphs have infinitely many points of intersection, the system has infinitely many solutions. Any point on the line $y = 2x + 3$ represents a solution.

- exact same equations = same line = IMS

Example 4 *Writing and Solving a Linear System*

A company offers two plans for high-speed Internet service, as described on page 431.

Plan A: You pay \$200 for the modem and \$30 per month for service.

Plan B: The modem is free and you pay \$40 per month for service.

a. After how many months are the total costs of the plans the same?

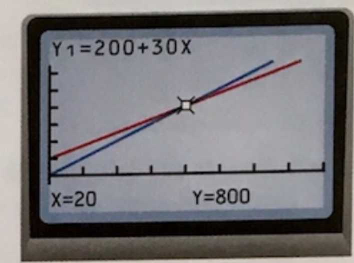
b. When is plan A a better deal? When is plan B a better deal?

Solution

a. Let y be the cost of each plan after x months. Write a linear system.

Plan A: $y = 200 + 30x$

Plan B: $y = 40x$



Use a graphing calculator to graph the equations. Trace along one of the graphs until the cursor is on the point of intersection. This point is (20, 800).

Answer The total costs of the plans are the same after 20 months, when each plan costs \$800.

b. The graph for plan A lies below the graph for plan B when $x > 20$, so plan A costs less if you have service for more than 20 months.

The graph for plan B lies below the graph for plan A when $x < 20$, so plan B costs less if you have service for less than 20 months.

8.8 Exercises Pp.434-435 3/2

Tell whether the ordered pair is a solution of the linear system.

8. (4, 2);
$y = -5x + 22$
$y = 8x - 30$

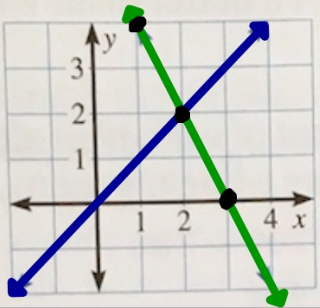
$2 = -5(4) + 22$?
$2 = -20 + 22$?
$2 = 2$ ✱

$2 = 8(4) - 30$?
$2 = 32 - 30$?
$2 = 2$ ✱

$\boxed{\text{Yes}}$

Use the graph to identify the linear equations, then identify the solution of the related linear system.

10.

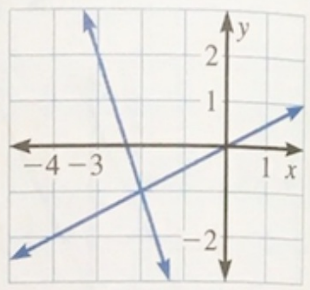


$\boxed{(2,2)}$

$y = x$ $y = -2x + 6$

Use the graph to identify the solution of the related linear system.

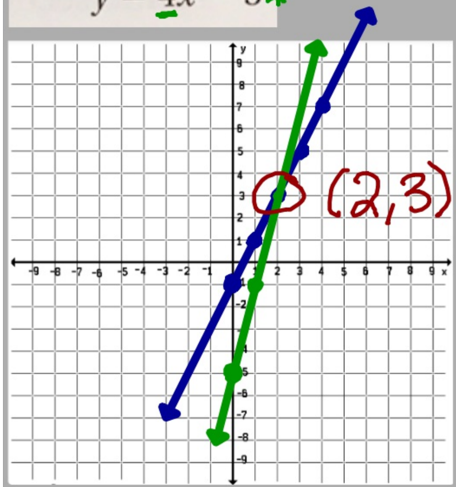
12.



$\boxed{(-2,-1)}$

Solve the linear system by graphing.

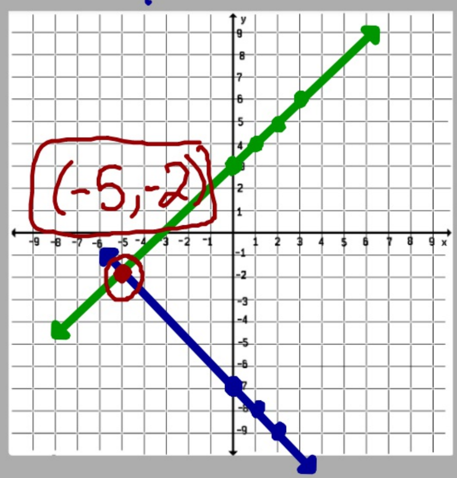
14. $y = 2x - 1$ *
$y = 4x - 5$ *



18. $x + y = -7$
$y = x + 3$

$x + y = -7$
$-x \quad\quad -x$
$y = -x - 7$

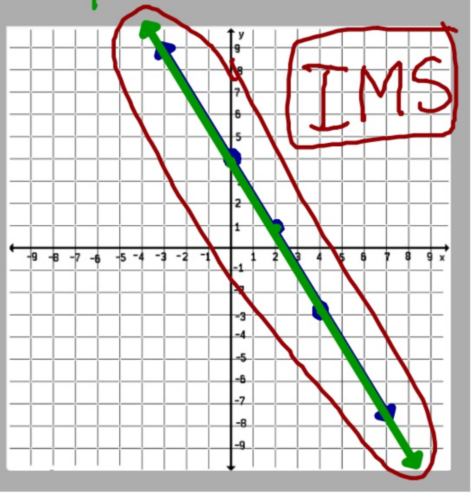
x	y
-2	-5
0	-7
2	-9



20. $3x + 2y = 8$
$4y = 16 - 6x$

$3x + 2y = 8$
$-3x \quad\quad -3x$
$\frac{2y}{2} = \frac{-3x + 8}{2}$
$y = -\frac{3}{2}x + 4$

$\frac{4y}{4} = \frac{16 - 6x}{4}$
$y = -\frac{3}{2}x + 4$



22. **Vacation Rentals** A business rents in-line skates and bicycles to tourists on vacation. A pair of skates rents for \$15 per day. A bicycle rents for \$20 per day. On a certain day, the owner of the business has 25 rentals and takes in \$450. Using the verbal model below, write and solve a system of equations to find the number of each item rented.

Pairs of skates	+	Number of bicycles	=	Total rentals

Rent per pair of skates	•	Pairs of skates	+	Rent per bicycle	•	Number of bicycles	=	Total income

$x+y=25$

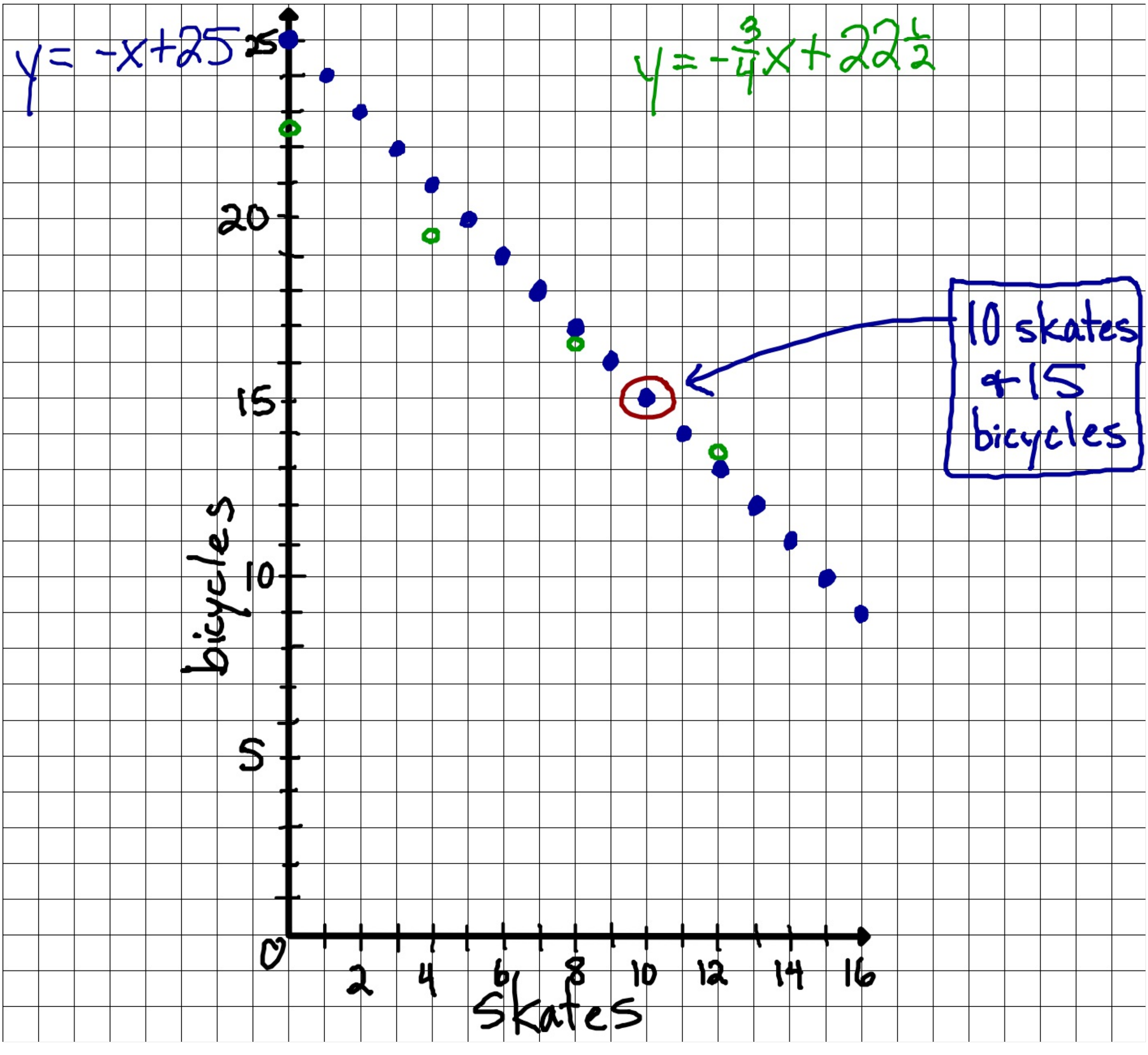
$y=-x+25$

$15x+20y=450$

$-15x \qquad -15x$

$\frac{20y}{20}=\frac{-15x+450}{20}$

$y=-\frac{3}{4}x+22\frac{1}{2}$



$y = -x + 25$
$y = -\frac{3}{4}x + 22\frac{1}{2}$
10 skates + 15 bicycles
bicycles
skates
0
5
10
15
20
25
2
4
6
8
10
12
14
16

$x = 10 + y = 15?$

$y = -x + 25$

$15 = -(10) + 25?$

$15 = 15$ ✱

$y = -\frac{3}{4}x + 22\frac{1}{2}$

$15 = -\frac{3}{4}(10) + 22\frac{1}{2}?$

$15 = -\frac{30}{4} + 22\frac{1}{2}?$

$15 = -7\frac{1}{2} + 22\frac{1}{2}?$

$15 = 15$ ✱

$\boxed{(10,15)}$

8.8 Exercises #9, 16, 17, & 27 3/2

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