Write each equation in slope-intercept form.

1) $3x + 4y = 8$

$-3x \quad -3x$

$\dfrac{4y}{4} = \dfrac{-3x + 8}{4}$

$y = -3/4x + 2$

2) $9x + 35 = -5y$

$\dfrac{}{-5} \quad \dfrac{}{-5}$

$y = \dfrac{-9}{5}x + {}^{-}7$

3) $2y - 6 = -6x$

$+6 \quad +6$

$\dfrac{2y}{2} = \dfrac{-6x + 6}{2}$

$y = -3x + 3$

4) $-11x - 7y = -56$

$+11x \qquad +11x$

$\dfrac{-7y}{-7} = \dfrac{11x - 56}{-7}$

$y = {}^{11}/_{7}x + 8$

5) $\dfrac{5}{3}y = -(x - 5)$

$y = -3/5x + 3$

6) $-2(2x + y) = 28$
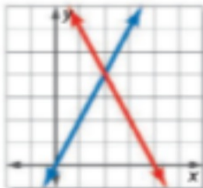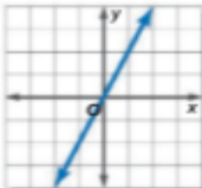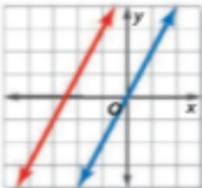
$y = -2x - 14$

1 **Possible Number of Solutions** The income from the CDs sold can be modeled by the equation $y = 10x$, where y represents the total income of selling the CDs, and x is the number of CDs sold.

If we graph these equations, we can see at which point the band begins making a profit. The point where the two graphs intersect is where the band breaks even. This happens when the band sells 250 CDs. If the band sells more than 250 CDs, they will make a profit.

The two equations, $y = 4x + 1500$ and $y = 10x$, form a **system of equations**. The ordered pair that is a solution of both equations is the solution of the system. A system of two linear equations can have one solution, an infinite number of solutions, or no solution.

- If a system has at least one solution, it is said to be **consistent**. The graphs intersect at one point or are the same line.

- If a consistent system has exactly one solution, it is said to be **independent**. If it has an infinite number of solutions, it is **dependent**. This means that there are unlimited solutions that satisfy both equations.

- If a system has no solution, it is said to be **inconsistent**. The graphs are parallel.

| **Concept**Summary Possible Solutions		
Number of Solutions	exactly one	infinite	no solution
Terminology	consistent and independent	consistent and dependent	inconsistent
Graph			

Example 1 Number of Solutions

Use the graph at the right to determine whether each system is *consistent* or *inconsistent* and if it is *independent* or *dependent*.

a. $y = -2x + 3$
$y = x - 5$

Since the graphs of these two lines intersect at one point, there is exactly one solution. Therefore, the system is consistent and independent.

$y = 2x + 3$

$y = x - 5$

$y = -2x - 5$

$y = -2x + 3$

b. $y = -2x - 5$
$y = -2x + 3$

Since the graphs of these two lines are parallel, there is no solution of the system. Therefore, the system is inconsistent.
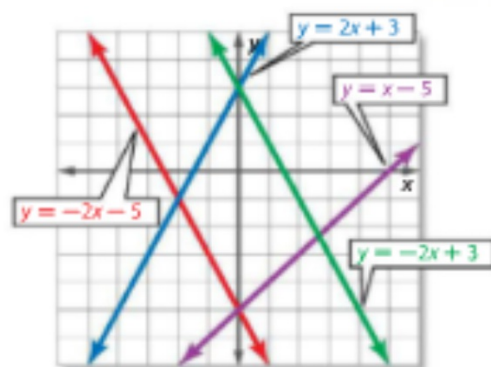
▶ **Guided**Practice

1A. $y = 2x + 3$ **consistent and**
$y = -2x - 5$ **independent**

1B. $y = x - 5$ **consistent and**
$y = -2x - 5$ **independent**

Example 2 Solve by Graphing

Graph each system and determine the number of solutions that it has. If it has one solution, name it.

a. $y = -3x + 10$
$y = x - 2$

The graphs appear to intersect at the point $(3, 1)$.
You can check this by substituting 3 for x and 1 for y.

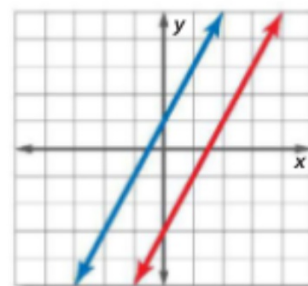| **CHECK** $y = -3x + 10$	Original equation
$1 \stackrel{?}{=} -3(3) + 10$	Substitution
$1 \stackrel{?}{=} -9 + 10$	Multiply.
$1 = 1 \checkmark$	
$y = x - 2$	Original equation
$1 \stackrel{?}{=} 3 - 2$	Substitution
$1 = 1 \checkmark$	Multiply.
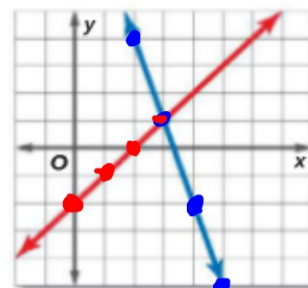
The solution is $(3, 1)$.

b. $2x - y = -1$
$4x - 2y = 6$

The lines have the same slope but different
y-intercepts, so the lines are parallel. Since they
do not intersect, there is no solution of this system.
The system is inconsistent.

g Systems of Equations

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