Algebra 1 – Unit 6 Study Packet

Solving Systems of Equations (Substitution, Elimination, Graphing, and Practical Practice)

Skill #1 – Solve Systems of Equations by Substitution and Elimination

1) Solve the following system of equations using the SUBSTITUTION method.

$$y = -2x + 1$$
$$2x - 2y = 4$$

$2x - 2(-2x+1) = 4$
$2x + 4x - 2 = 4$
$6x - 2 = 4$
$+2 \quad +2$
$\frac{6x}{6} = \frac{6}{6}$
$\boxed{x = 1}$

$y = -2(1) + 1$
$y = -2 + 1$
$\boxed{y = -1}$

2) Solve the following system of equations using the ELIMINATION method.

$$-8x - 10y = 28$$
$$+ \quad 4x + 10y = -24$$
$$-4x = 4$$
$$\frac{-4x}{-4} = \frac{4}{-4}$$
$$\boxed{x = -1}$$

$-8(-1) - 10y = 28$
$8 - 10y = 28$
$-8 \quad\quad -8$
$\frac{-10y}{-10} = \frac{10}{-10}$
$\boxed{y = -1}$

3) Emily begins working out a system of equations problem in her math class. Which of the following methods is Emily using to solve?

Given: $\begin{cases} x + y = 6 \\ 3x + y = 15 \end{cases}$

Step 1: $\begin{cases} x = 6 - y \\ 3x + y = 15 \end{cases}$

Step 2: $3(6 - y) + y = 15$

(A) Substitution **B** Elimination
C Graphing **D** System

4) What number could the bottom equation be multiplied by in order to create a coefficient to eliminate in front of the y variables.

$$-x + 4y = 25$$
$$4(3x - y = 13)4$$

A 3
B 25
C 13
(D) 4

5) Solve the system of equations:

$$\begin{cases} 5x - 7y = -2 \\ -5x - 10y = -15 \end{cases}$$

A (7,1) **B** (-1,1)
(C) (1,1) **D** (0,7)

6) Solve the system of equations:

$$\begin{cases} 2x - 4y = 20 \\ -6x + y = 6 \end{cases}$$

A (-6,-2) (B) (-2,-6)
C (2,6) **D** (-2,6)

7) Is (1, 3) a solution to this system of equations?

$2x + 6y = 20$
$x + 4y = 13$

True

True or False?

8) Is (1, 9) a solution to this system of equations?

$y = 8x + 1$
$y = x + 4$

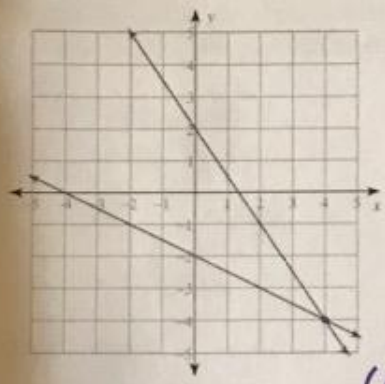
False

True or False?

Skill #1 ☐ Given a system of two linear equations in two variables that has a unique solution, I can solve the system by substitution or elimination to identify the ordered pair which satisfies both equations and I can solve and confirm algebraic solutions to a system of two linear equations using a graphing utility.
☐ Need more practice (IXL – U.8, U.10, U.1, U.14)

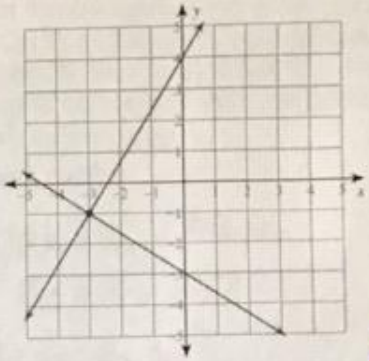
Skill #2 – Solve Systems of Equations by Graphing

1) What is the solution to the system of equations represented below?



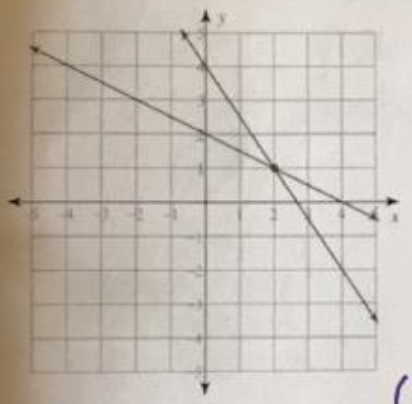
(4, -4)

2) What is the solution to the system of equations represented below?



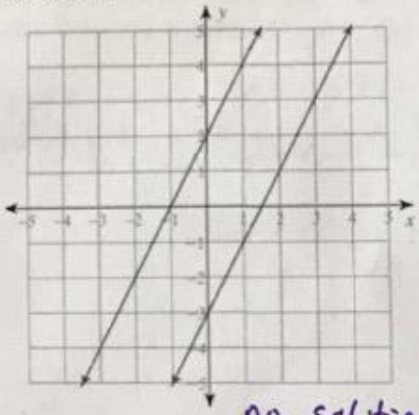
(-3, -1)

3) What is the solution to the system of equations represented below?



(2, 1)

4) What is the solution to the system of equations represented below?



no solution

5) What is the solution to the system of equations represented below? Write your answer as an ordered pair:

$$x + y = -6$$
$$4x + y = 3$$

(3, -9)

6) What is the solution to the system of equations represented below? Write your answer as an ordered pair:

$$x - 7y = -21$$
$$13x - 7y = 63$$

(7, 4)

7) What is the solution to the system of equations represented below? Write your answer as an ordered pair:

$$3x + y = 3$$
$$6x + 2y = 6$$

infinite solutions

8) What is the solution to the system of equations represented below? Write your answer as an ordered pair:

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

(2, 3)

Skill #2 ☐ Given a system of two linear equations in two variables that has a unique solution, I can solve the system graphically by identifying the point of intersection. Determine whether a system of two linear equations has one, an infinite number, or no solutions.

☐ Need more practice (IXL – U.2, U.14)

Skill #3 – Solve Practical Problems with Systems of Equations

1) Last season two running backs on the Steelers football team rushed for a combined total of 1550 yards. One rushed 4 times as many yards as the other. How many yards were rushed by each player?

x - player #1 rushing yards
y - player #2 rushing yards

$x + y = 1550$
$x = 4y$

(1240, 310)
player #1, player #2

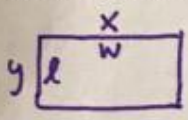
2) On Monday Joe bought 10 cups of coffee and 5 doughnuts for his office at the cost of $16.50. It turns out that the doughnuts were more popular than the coffee. On Tuesday he bought 5 cups of coffee and 10 doughnuts for a total of $14.25. How much was each cup of coffee and each doughnut?

x - cups of coffee cost
y - doughnut cost

$10x + 5y = \$16.50$
$5x + 10y = \$14.25$

($1.25, $0.80)
coffee, doughnuts

3) Rose is creating a rectangular quilt and the length is equal to four inches less than the width. The perimeter is 24 inches. What are the dimensions of the quilt?



$y = x - 4$
$2x + 2y = 24$

x y
(8, 4)
w, l

A Length = 4 and width = -8
B Length = 4 and width = 8
C Length = 8 and width = 4
D Length = 4 and width = -4

4) Josephine sold a total of 40 slices of pie. Each piece of apple pie costs $1.50 and each piece of chocolate pie costs $2.75. Josephine made $75 at the bake sale. How many slices of apple pie did she sale?

x - apple pie
y - chocolate pie

$x + y = 40$
$\$1.50x + \$2.75y = \$75$

(28, 12)
x y

A 28
B 12
C 40
D 26

5) There are two different sized drinks sold at the local movie theater. A family bought 4 small drinks and 10 large drinks for $38.00. A group of students bought 1 small drink and 6 large drinks for $20.00. How much is a small drink? Write your answer in blank.

x - small drink cost
y - large drink cost

$4x + 10y = 38$
$x + 6y = 20$

(2, 3)
x y

#2

6) The Large family and the Small family are going to a water park. The Large family has 12 members going, 5 adults and 7 children, who paid $97.50 total for admission. The Small family made up of 2 adults and 3 children paid $40 for admission. If x represents the admission price of each adult and y represents the admission price of each child, which is a system of equations that could be used to determine the admission price of an adult?

A $\begin{cases} 7x + 5y = \$97.50 \\ 3x + 2y = \$40 \end{cases}$

B $\begin{cases} 5x + 7y = \$12 \\ 2x + 3y = \$40 \end{cases}$

C $\begin{cases} 5x + 7y = \$97.50 \\ 2x + 3y = \$40 \end{cases}$

D $\begin{cases} 5x + 7y = \$40 \\ 2x + 3y = \$97.50 \end{cases}$

Skill #3 ☐ Write a system of two linear equations that models a practical situation. Solve practical problems involving equations and systems of equations.
☐ Need more practice (IXL – U.15)