

PRACTICE TEST UNIT 4: Systems of Linear Equations

8th Grade Math

Name: Key

For 1 & 2, Solve the following equations for y. This means into the form $y = mx + b$.

1. $12 - y = 3x$
 $-12 \quad -12$

$-y = 3x + -12$
 $\frac{-y}{-1} = \frac{3x}{-1} + \frac{-12}{-1}$

2. $-30 = 3y + 12x$
 $-12x \quad -12x$

$\frac{-12x + -30}{3} = \frac{3y}{3}$

#1 answer: $y = -3x + 12$

#2 answer: $y = -4x + -10$

For 3–5, circle the number of solutions that the system will have and circle the correct explanation.

Explanation

3. $y = 6x - 8$
 $y = 9 + 6x$

zero
 one
 infinitely many

Same Slopes
 & Different
 y-intercepts

Same Slopes
 & Same
 y-intercepts

Different
 Slopes

4. $y = \frac{1}{5}x + 9$
 $y = 5x + 9$

zero
 one
 infinitely many

Same Slopes
 & Different
 y-intercepts

Same Slopes
 & Same
 y-intercepts

Different
 Slopes

5. $y = \frac{2}{3}x + 11$
 $y = \frac{1}{3}x + 11$

zero
 one
 infinitely many

Same Slopes
 & Different
 y-intercepts

Same Slopes
 & Same
 y-intercepts

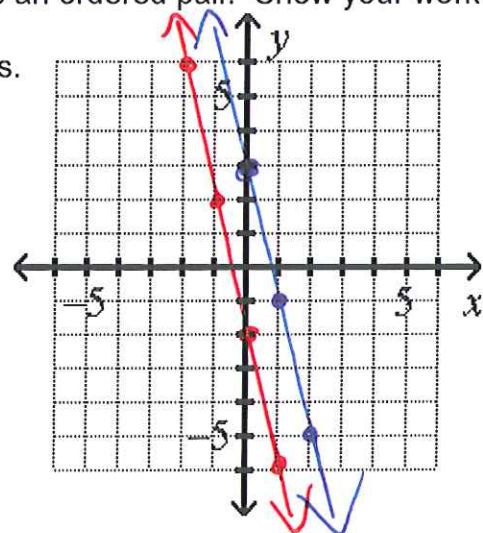
Different
 Slopes

For 6–8, solve by the given method. Write your answer as an ordered pair. Show your work.

6. Solve by **graphing**. Both lines need to cross each axis.

$y = -4x + 3$ → $m = \frac{\downarrow 4}{\rightarrow 1}$ $b = (0, 3)$
 $y = -4x - 2$ → $m = \frac{\downarrow 4}{\rightarrow 1}$ $b = (0, -2)$

Write your answer as an ordered pair.



#6 answer: No Solutions
(Parallel Lines)

7. Solve by substitution.

$$\begin{array}{l} x = y + 1 \\ x + 2y = 10 \end{array} \quad \left| \quad \begin{array}{l} x = 3 + 1 \\ x = 4 \end{array} \right.$$

$$\begin{array}{l} y + 1 + 2y = 10 \\ 3y + 1 = 10 \\ -1 \quad -1 \\ 3y = 9 \\ \frac{3y}{3} = \frac{9}{3} \\ y = 3 \end{array} \quad \left| \quad \begin{array}{l} x = 3 + 1 \\ x = 4 \end{array} \right.$$

#7 answer: $(4, 3)$

8. Solve by elimination.

$$\begin{array}{l} 4x + y = 1 \\ 4x + -5y = -5 \end{array} \xrightarrow{m(-1)} \begin{array}{l} 4x + y = 1 \\ -4x + 5y = 5 \end{array}$$

$$\begin{array}{r} 4x + y = 1 \\ -4x + 5y = 5 \\ \hline 6y = 6 \\ \frac{6y}{6} = \frac{6}{6} \\ y = 1 \end{array}$$

$$\begin{array}{l} 4x + 1 = 1 \\ -1 \quad -1 \\ 4x = 0 \\ \frac{4x}{4} = \frac{0}{4} \\ x = 0 \end{array}$$

#8 answer: $(0, 1)$

For 9–13, Solve using any method you choose. Write your answer as an ordered pair. Show all of your work.

9. $\begin{array}{l} 5x - 6y = 4 \\ 4x + 3y = 11 \end{array} \xrightarrow{m(2)} \begin{array}{l} 5x - 6y = 4 \\ 8x + 6y = 22 \end{array}$

$$\begin{array}{r} 5x - 6y = 4 \\ 8x + 6y = 22 \\ \hline 13x = 26 \\ \frac{13x}{13} = \frac{26}{13} \\ x = 2 \end{array}$$

$$\begin{array}{l} 5(2) - 6y = 4 \\ 10 - 6y = 4 \\ -10 \quad -10 \\ -6y = -6 \\ \frac{-6y}{-6} = \frac{-6}{-6} \\ y = 1 \end{array}$$

#9 answer: $(2, 1)$

11. $\begin{array}{l} y + 2x = 20 \\ x = y + 4 \end{array}$

$$\begin{array}{l} y + 2(y + 4) = 20 \\ y + 2y + 8 = 20 \\ 3y + 8 = 20 \\ 3y = 12 \\ y = 4 \end{array} \quad \left| \quad \begin{array}{l} x = y + 4 \\ x = 8 \end{array} \right.$$

#11 answer: $(8, 4)$

10. $\begin{array}{l} -3x + 6y = 18 \\ x - 2y = -10 \end{array} \xrightarrow{m(3)} \begin{array}{l} -3x + 6y = 18 \\ 3x + -6y = -30 \end{array}$

$$\begin{array}{r} -3x + 6y = 18 \\ 3x + -6y = -30 \\ \hline 0 = -12 \end{array}$$

#10 answer: **No Solutions**

12. $\begin{array}{l} y = x - 3 \\ y = -x + 1 \end{array}$

$$\begin{array}{l} x - 3 = -x + 1 \\ +x \quad +x \\ 2x - 3 = 1 \\ 2x = 4 \\ x = 2 \end{array} \quad \left| \quad \begin{array}{l} y = 2 - 3 \\ y = -1 \end{array} \right.$$

#12 answer: $(2, -1)$

13. $-8 = -6y + 2x$
 $x = 3y - 4$

$-8 = -6y + 2(3y - 4)$

$-8 = -6y + 6y + -8$

$-8 = -8$ ✓

Infinately

#13 answer: Many Solutions

14. Line 1 goes through the points (-7, -5) and (7, -19) and Line 2 line goes through the points (2, 6) and (3, 10). Will Line 1 and Line 2 intersect? Show evidence to support your answer by showing your work mathematically.

<p>Step 1: $m = \frac{-5 - (-19)}{-7 - 7} = \frac{14}{-14} = -1$</p> <p>Step 2: $-5 = -1(-7) + b$ $-5 = 7 + b$ $b = -12$</p>	<p>Step 1: $m = \frac{6 - 10}{2 - 3} = \frac{-4}{-1} = 4$</p> <p>Step 2: $6 = 4(2) + b$ $6 = 8 + b$ $b = -2$</p>	<p>Step 3: $y = -x + 12$</p> <p>Step 3: $y = 4x - 2$</p> <hr/> <p>Step 4: $4x - 2 = -x + 12$ $+x + 2 \quad +x + 2$ $5x = 10$ $x = 2$</p>
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#14 answer: Circle one YES or NO If YES, $y = 4(-2) - 2$

write answer as an order pair: (-2, -10) $y = -8 - 2$
 $y = -10$

For 15–19, use the following information. Dan and Lucas are having a weight lifting competition. Dan starts with 110 pounds on the bench press and goes up 6 pounds a week, while Lucas starts with 60 pounds but goes up 11 pounds each week.

$x = \# \text{ of weeks}$ $y = \# \text{ of lbs being benched press}$

15. Create an equation for Dan's situation.

16. Create an equation for Lucas's situation.

#15 answer: $y = 6x + 110$

#16 answer: $y = 11x + 60$

17. Solve the system of equations. Write your answer as an ordered pair. Show your work.

$11x + 60 = 6x + 110$
 $-6x \quad -60 \quad -6x \quad -60$
 $5x = 50$
 $x = 10$

$y = 6(10) + 110$
 $y = 60 + 110$
 $y = 170$

#17 answer: (10, 170)

18. When will Dan and Lucas lift the same amount of weight?

#18 answer: 10 weeks

19. When they lift the same weight, how much weight is it?

#19 answer: 170 lbs

For 20–24, use the following information. There are 11 animals in a barnyard. Some are chickens and some are sheep. There are 38 legs in all. How many of each type of animal are in the barn?

$x = \# \text{ chickens}$ $y = \# \text{ of sheep}$

20. Create an equation to represent the number of animals. #20 answer: $x + y = 11$

21. Create an equation to represent the number of legs. #21 answer: $2x + 4y = 38$

22. Solve the system of equations. Write your answer as an ordered pair. Show your work.

$$\begin{array}{r} x + y = 11 \\ 2x + 4y = 38 \end{array} \xrightarrow{m(-2)} \begin{array}{r} -2x + -2y = -22 \\ +2x + 4y = 38 \end{array}$$

$$\begin{array}{r} x + 8 = 11 \\ x = 3 \end{array}$$

#22 answer: (3, 8)

$$y = 16$$

23. How many chickens are in the barn?

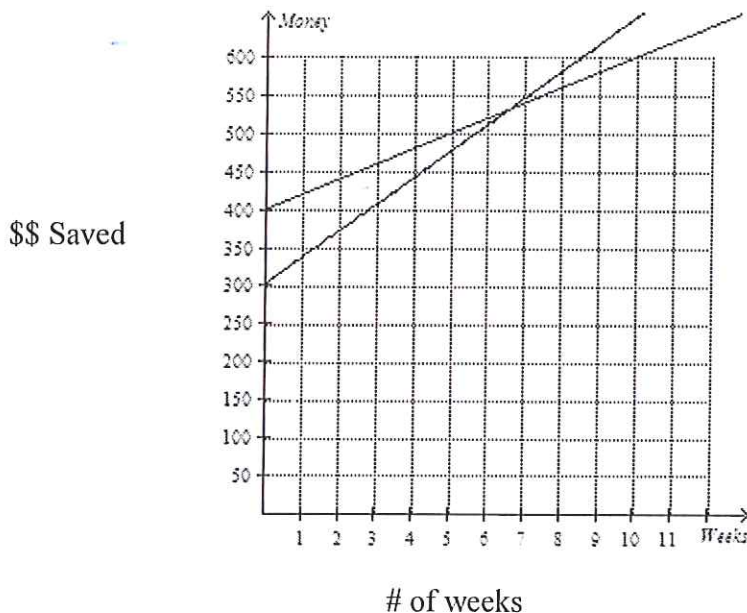
$$y = 8$$

#23 answer: 3 chickens

24. How many sheep are in the barn?

#24 answer: 8 sheep

For 25 & 26, use the following information. The graph below illustrates the rate at which Dave and Kari are saving money.



25. Write down an Estimate to the solution. Write the answer as an ordered pair.

#25 answer: (6.5, 525)

26. Distinguish what this point means in the context of the car loan scenario.

After 6 1/2 weeks, Kari and Dave will both have saved about \$525.