

Test #2

Name: Madame Solutions

Math 71A, Prof. Beydler

Wednesday, April 20, 2016

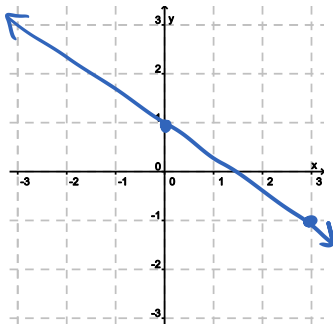
Directions: Show all work. No books or notes. A scientific calculator is allowed. Your desk and lap must be clear (no phones, notebooks, etc.). Write your answers in the indicated places, or box your answers. Good luck!

1. (1 point) Find the slope of the line passing through (4, 3) and (-1, 3) or state that the slope is undefined.

Answer: 0

$$m = \frac{3-3}{-1-4} = \frac{0}{-5} = 0$$

2. (2 points) Graph the equation  $y = -\frac{2}{3}x + 1$  on the rectangular coordinate system below.



↑  
slope:  $-\frac{2}{3}$

3. (2 points) Give the slope and y-intercept for the line whose equation is  $3x - 2y = 5$ .

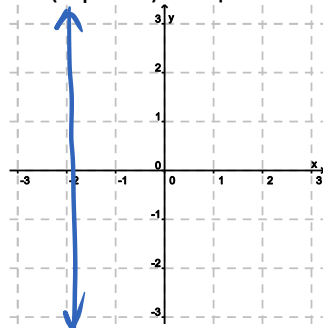
$$\frac{-2y}{-2} = \frac{-3x+5}{-2}$$

$$y = \frac{3}{2}x - \frac{5}{2}$$

Slope:  $\frac{3}{2}$

y-intercept:  $-\frac{5}{2}$

4. (1 point) Graph the equation  $x = -2$  on the rectangular coordinate system below.



5. (2 points) What is the slope of any line perpendicular to the line whose equation is  $10x - 7y = 12$ ?

$$\begin{aligned} -7y &= -10x + 12 \\ y &= \frac{10}{7}x - \frac{12}{7} \end{aligned}$$

Answer:  $-\frac{7}{10}$

6. (2 points) Write the slope-intercept form of the equation for the line passing through  $(1, -2)$  and parallel to the line whose equation is  $2x - y = 3$ .

$$\begin{aligned} -y &= -2x + 3 \\ y &= 2x - 3 \end{aligned}$$

Answer:  $y = 2x - 4$

$$\begin{aligned} y - (-2) &= 2(x - 1) \\ y + 2 &= 2x - 2 \\ y &= 2x - 4 \end{aligned}$$

7. (3 points) Solve the system by the substitution method or the addition method (that is, find the solution set). State if the system is inconsistent, dependent, or neither.

$$\begin{aligned} x - 2y &= 4 \\ 2x &= 4y + 5 \end{aligned}$$

Solution set:  $\emptyset$

$$\begin{array}{r} x - 2y = 4 \\ 2x - 4y = 5 \end{array} \xrightarrow{\cdot(-2)} \begin{array}{r} -2x + 4y = -8 \\ 2x - 4y = 5 \end{array}$$

Inconsistent    Dependent    Neither  
(circle one above)

$$0 = -3 \leftarrow \text{false}$$

8. (4 points) Solve the system by the substitution method or the addition method (that is, find the solution set). State if the system is inconsistent, dependent, or neither.

$$\begin{array}{l} \frac{1}{4}x - \frac{1}{9}y = \frac{2}{3} \\ \frac{1}{2}x - \frac{1}{3}y = 1 \end{array} \begin{array}{l} \xrightarrow{\cdot 36} \\ \xrightarrow{\cdot 6} \end{array} \begin{array}{l} 9x - 4y = 24 \\ 3x - 2y = 6 \end{array} \begin{array}{l} \\ \xrightarrow{\cdot (-2)} \end{array} \begin{array}{l} 9x - 4y = 24 \\ \underline{-6x + 4y = -12} \\ 3x = 12 \\ x = 4 \end{array}$$

Find y:

$$\begin{aligned} 3(4) - 2y &= 6 \\ 12 - 2y &= 6 \\ -2y &= -6 \\ y &= 3 \end{aligned}$$

Solution set:  $\{(4, 3)\}$

Inconsistent    Dependent    Neither  
(circle one above)

9. (4 points) A coin purse contains a mixture of 15 coins in dimes and quarters. The coins have a total value of \$3.30. Determine the number of dimes and the number of quarters in the purse.

Let  $x = \#$  of dimes  
 $y = \#$  of quarters

Number of dimes: 3

Number of quarters: 12

$$\begin{array}{l} x + y = 15 \\ 10x + 25y = 330 \end{array} \begin{array}{l} \xrightarrow{\cdot (-10)} \\ \\ \end{array} \begin{array}{l} -10x - 10y = -150 \\ \underline{10x + 25y = 330} \\ 15y = 180 \\ y = 12 \end{array}$$

Find x:

$$\begin{aligned} x + 12 &= 15 \\ x &= 3 \end{aligned}$$

10. (4 points) When an airplane flies with the wind, it can travel 450 miles in 3 hours. When the same airplane flies in the opposite direction against the wind, it takes 5 hours to fly the same distance. Find the average rate of the plane in still air and the average rate of the wind. (Be sure to write the units of your answers.)

Let  $x = \text{avg. rate of plane}$   
 $y = \text{avg. rate of wind}$

Average rate of plane: 120 mph

Average rate of wind: 30 mph

$$\text{With wind: } 450 = (x+y) \cdot 3 \xrightarrow{\div 3} x+y = 150$$

$$\text{Against wind: } 450 = (x-y) \cdot 5 \xrightarrow{\div 5} x-y = 90$$

$$2x = 240$$

$$x = 120$$

Find y:

$$120 + y = 150$$

$$y = 30$$

11. (5 points) Solve the system.

- ①  $2x + y = 2$
- ②  $x + y - z = 4$
- ③  $3x + 2y + z = 0$

$$\textcircled{2} \quad x + y - z = 4$$

$$\textcircled{3} \quad 3x + 2y + z = 0$$

$$4x + 3y = 4$$

Solution set:  $\{(1, 0, -3)\}$

$$\textcircled{1} \quad \begin{array}{l} 2x + y = 2 \\ 4x + 3y = 4 \end{array} \xrightarrow{\cdot(-2)} \begin{array}{l} -4x - 2y = -4 \\ 4x + 3y = 4 \end{array}$$

$$y = 0$$

Find x:

$$2x + 0 = 2$$

$$x = 1$$

Find z:

$$1 + 0 - z = 4$$

$$-z = 3$$

$$z = -3$$

12. (2 points) Solve the following inequality. Express the solution set using **interval notation**.

$$6x + 5 > -2(x - 3) - 25$$

$$6x + 5 > -2x + 6 - 25$$

$$6x + 5 > -2x - 19$$

$$8x > -24$$

$$x > -3$$

Solution set:  $(-3, \infty)$

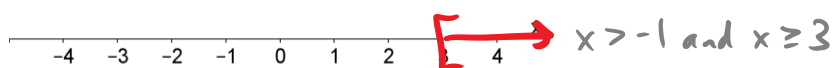
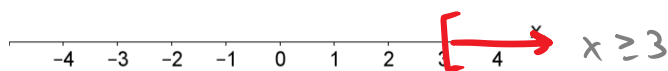
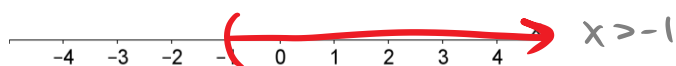
13. (3 points) Solve the following compound inequality. Express the solution set using **interval notation**.

$$3x - 5 > -8 \text{ and } 2 - 3x \leq -7$$

$$3x > -3 \quad -3x \leq -9$$

$$x > -1 \quad \text{and} \quad x \geq 3$$

Solution set:  $[3, \infty)$



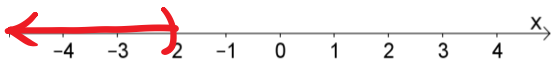
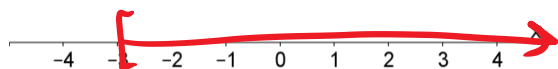
14. (3 points) Solve the following compound inequality. Express the solution set using **interval notation**.

$$5x + 4 \geq -11 \text{ or } -3x > 8 + x$$

$$5x \geq -15 \quad -4x > 8$$

$$x \geq -3 \quad \text{or} \quad x < -2$$

Solution set:  $(-\infty, \infty)$



15. (1 point) Find  $\{-1, 0, 1, 2\} \cap \{3, 4, 5\}$ . Answer:            $\emptyset$           

16. (1 point) Find  $\{2, 3, 5\} \cup \{1, 2, 4\}$ . Answer:            $\{1, 2, 3, 4, 5\}$           

17. (1 point) Circle the correct word to fill in the blank.

For systems of equations, if you get a true statement (like  $0=0$ ), then system is \_\_\_\_\_.

inconsistent   dependent   conditional  
(circle one above)

Note: Be sure to double check your work. And don't forget to turn in your homework! 😊