Algebra I
Unit 6 Test Review – Systems

Name KEY
Date _____ Period ____

Solve the following using the method of your choice.

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

$-\frac{1}{5}x + y = 2$

$+\frac{1}{5}x \quad +\frac{1}{5}x$

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

GRAPHING → solve for y

SAME LINE!
infinite solutions

2. $-2x + 2y = 6$
$3x - y = 3$ (×2)

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

$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

ELIMINATION

$-2(3) + 2y = 6$
$-6 + 2y = 6$
$+6 \quad +6$

$\frac{2y}{2} = \frac{12}{2}$

$y = 6$

(3, 6)

How many solutions does each system of equations have? (One, none or infinite) solve for y, check the graph!

3. ① $3x - 9y = 12$
② $-x + 3y = -3$

① $3x - 9y = 12$
$-3x \quad -3x$

$\frac{-9y}{-9} = \frac{-3x}{-9} + \frac{12}{-9}$

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

② $-x + 3y = -3$
$+x \quad +x$

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

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

PARALLEL → No solution

4. ① $-2x + y = 10$
② $x - 4y = 8$

① $-2x + y = 10$
$+2x \quad +2x$

$y = 2x + 10$

② $x - 4y = 8$
$-x \quad -x$

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

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

different slopes, intersect once

ONE solution

Is the point (2, -3) a solution to the following systems? x=2 y=-3 Plug in points → TWO true statements

5. ① $y = -2x + 1$
② $2x + y = 10$

① $-3 \stackrel{?}{=} -2(2) + 1$
$-3 = -4 + 1$
$-3 = -3$ ✓

② $2(2) + (-3) \stackrel{?}{=} 10$
$4 + (-3) = 10$
$1 = 10$ ✗

Not a solution

6. ① $4y \geq 2 - 9x$
② $10 \leq \frac{7}{2}x - y$

① $4(-3) \stackrel{?}{\geq} 2 - 9(2)$
$-12 \geq 2 - 18$
$-12 \geq -16$ ✓

② $10 \leq \frac{7}{2}(2) - (-3)$
$10 \leq 7 + 3$
$10 \leq 10$ ✓

yes, it is a solution

The point (x, -7) is a solution to the following system of equations. What is the value of x?

7. $-5x + y = -2$
$2x - y = 5$

y = -7 Plug it in.

$-5x + (-7) = -2$
$-5x - 7 = -2$
$+7 \quad +7$
$\frac{-5x}{-5} = \frac{5}{-5}$

x = -1

Set up a system for each, then solve. Let y be total fare. Let x be miles

8. Suppose that taxi-company A has a fare schedule of $1.15 per mile plus a $3 usage fee. Taxi-company B charges $0.90 per mile plus a $5 usage fee. How far can you travel so that the fares are equal?

company A: $y = 1.15x + 3$

company B: $y = 0.90x + 5$

GRAPHING!

x	y_1	y_2
6	9.9	10.4
7	11.05	11.3
8	12.2	12.2
9	13.35	13.1

(8, 12.2)

What does the solution mean? The fare is $12.20 for both companies if you travel 8 miles.

9. During a football game, pretzels and sodas are sold to raise money for new uniforms. Pretzels, *p*, sell for $2 each and $2.50 for a soda, *s*. Total sales equaled $336. Twice as many sodas as pretzels were sold. How many sodas and pretzels were sold?

MORE SODA!!

$2p + 2.50s = 336$

$s = 2p$

substitution!

$2p + 2.50(2p) = 336$

$2p + 5p = 336$

$7p = 336$

$p = 48$ $s = 2(48) = 96$

What does the solution mean? There were 48 pretzels and 96 sodas sold.

10. The difference between the length and the width of a rectangle is 4 inches. The perimeter of the rectangle is 28 inches. What is the length, *l*, and the width, *w*, of the rectangle?

$2(L - W = 4) \rightarrow 2L - 2W = 8$

$2L + 2W = 28$

$+ 2L + 2W = 28$

$4L = 36$

$L = 9$

elimination!

$2(9) + 2W = 28$

$18 + 2W = 28$

$2W = 10$

$W = 5$

What does the solution mean? The length is 9 inches and the width is 5 inches.

11. Debbie and Joey decided to earn money during the summer. Debbie had $8 to start with and earns $8 an hour at her job. Joey had $16 to start with and earns $6 per hour at his job. What is the minimum number of whole hours Debbie needs to work in order to have more money than Joey? Let y be total money. Let x be hours worked.

Debbie: $y = 8 + 8x$

Joey: $y = 16 + 6x$

Debbie > Joey

$8 + 8x > 16 + 6x$

$-6x \quad -6x$

$8 + 2x > 16$

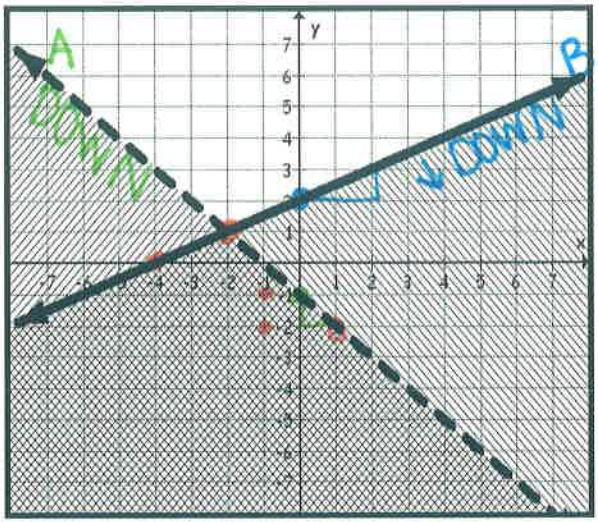
$-8 \quad -8$

$\frac{2x}{2} > \frac{8}{2}$

$x > 4$

Debbie needs to work at least 5 hours to have more money.

Use the graph to answer the following questions.



A: $y < -x - 1$

B: $y \leq \frac{1}{2}x + 2$

12. Which of the following accurately describe the system of inequalities?

I. $y \leq \frac{1}{2}x + 2$ ✓
$y < -x - 1$ ✓

II. $y \leq 2x + 2$
$y < -x - 1$

III. $y \leq 2(x + 1)$ → $y \leq 2x + 2$
$y < -x - 1$

IV. $x - 2y \geq -4$ ✓ Solve for y!
$x + y < -1$

$x - 2y \geq -4$
$-x \quad -x$
$\frac{-2y}{-2} \geq \frac{-x-4}{-2}$ FLIP → $y \leq \frac{1}{2}x + 2$

$x + y < -1$
$-x \quad -x$
$y < -x - 1$ ✓

- A. I only
- ~~B. II only~~
- C. I and IV
- ~~D. II and III~~
- ~~E. IV only~~

13. Which of the following do not accurately describe a solution to the system of inequalities?

I. (-2, 1) dotted line! NO

II. (-1, -1) yes

III. (-1, -2) yes

IV. (-4, 0) yes (solid line)

V. (1, -2) NO (dotted line)

- A. I only
- B. V only
- C. II and III
- D. I, IV and V
- E. I, II and III

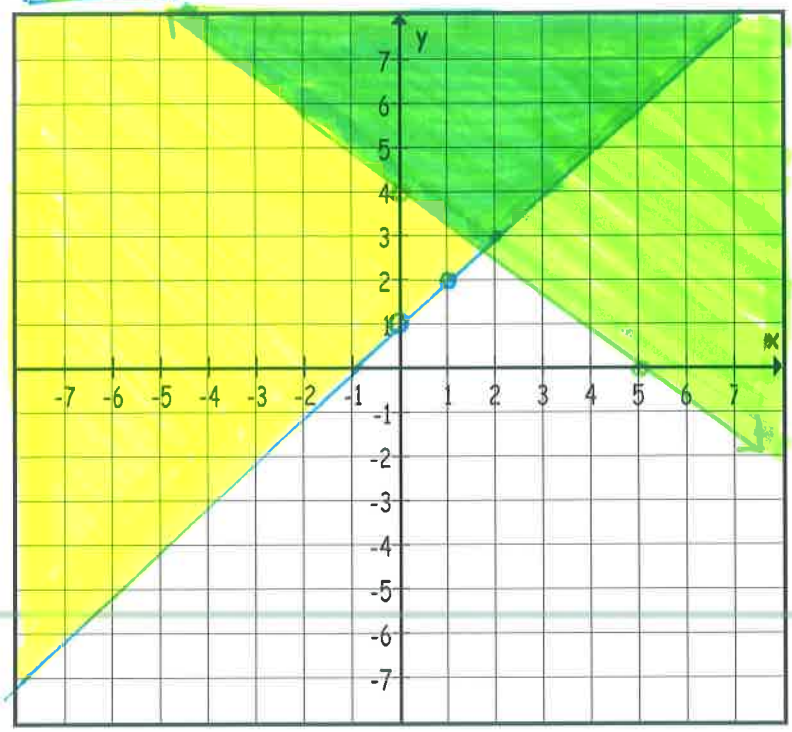
I and V

SOLVE for y!

Solve each system of inequalities below by graphing. Name one solution point.

14. $4x + 5y \geq 20$

$y \geq x + 1$ SOLID, UP



$4x + 5y \geq 20$

$-4x \quad -4x$

$\frac{5y}{5} \geq \frac{-4x}{5} + \frac{20}{5}$

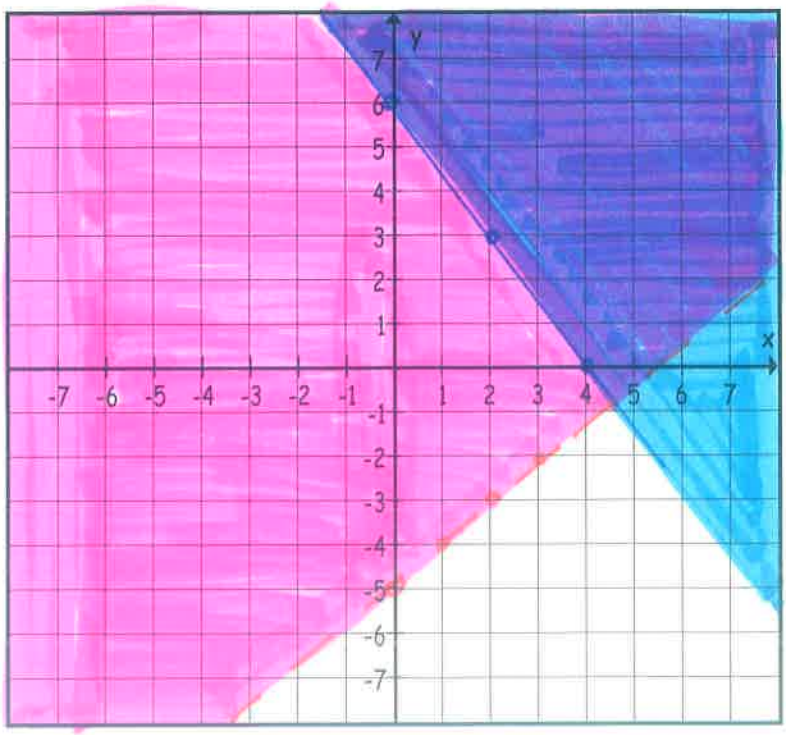
$y \geq -\frac{4}{5}x + 4$

SOLID, UP

SOLUTIONS are in double-shaded region.

15. $3x + 2y \geq 12$

$x - y < 5$



$3x + 2y \geq 12$

$-3x \quad -3x$

$\frac{2y}{2} \geq \frac{-3x}{2} + \frac{12}{2}$

$y \geq -\frac{3}{2}x + 6$

SOLID, UP.

$x - y < 5$

$-x \quad -x$

$\frac{-y}{-1} < \frac{-x}{-1} + \frac{5}{-1}$ FLIP!

$y > x - 5$

Dotted, UP