Chapter 3 Review Worksheet

Name: KEY

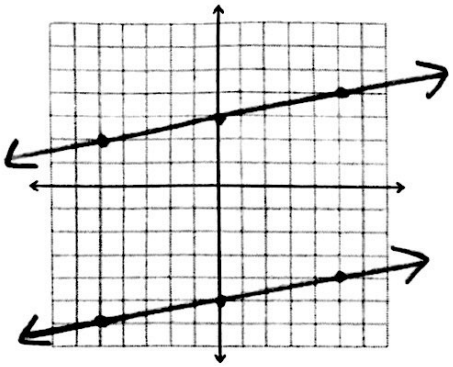
Solve the linear system by graphing (show me how you graphed). Remember, you must check your solution algebraically. Then classify the system as *consistent and independent*, *consistent and dependent*, or *inconsistent*.

1.) $-x + 5y = 15$

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

$5y = x + 15$

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



solution: no solution

classify: inconsistent

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

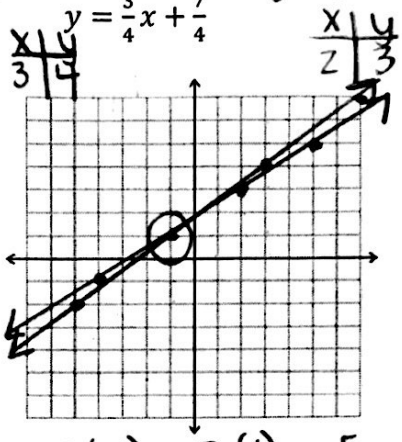
$y = \frac{3}{4}x + \frac{7}{4}$

$3y = 2x + 5$

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

x	y
3	4

x	y
2	3



$-2(-1) + 3(1) = 5$

$5 = 5$ ✓

$1 = \frac{3}{4}(-1) + \frac{7}{4}$

$1 = \frac{4}{4}$

$1 = 1$ ✓

solution: (-1, 1)

classify: consistent independent

3.) $2y - 2 = -10x$

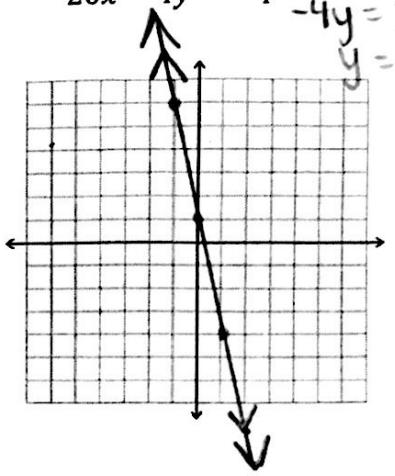
$-20x - 4y = -4$

$2y = -10x + 2$

$y = -5x + 1$

$-4y = 20x - 4$

$y = -5x + 1$



solution: infinitely many

classify: consistent dependent

Solve the linear system using substitution.

4.) $8x + 2y = 2$

$x + 3y = 14 \rightarrow x = 14 - 3y$

$8(14 - 3y) + 2y = 2$

$112 - 24y + 2y = 2$

$112 - 22y = 2$

$-22y = -110$

$y = 5$

$x = 14 - 3(5)$

$x = -1$

$(-1, 5)$

5.) $7x - 3y = 6$

$-2x + 5y = -10 \rightarrow x = 2.5y + 5$

$-2x = -5y - 10$

$7(2.5y + 5) - 3y = 6$

$17.5y + 35 - 3y = 6$

$14.5y = -29$

$y = -2$

$x = 2.5(-2) + 5$

$x = 0$

$(0, -2)$

Solve the linear system using elimination.

6.) $3x = 8y$

$3(-2x + 5y = -2)$

$2(3x - 8y = 0)$

$-6x + 15y = -6$

$+ \quad 6x - 16y = 0$

$-y = -6$

$y = 6$

$3x = 8(6)$

$3x = 48$

$x = 16$

$(16, 6)$

7.) $4(4x - 10y = 18)$

$-16x + 40y = -45$

$+ \quad 16x - 40y = 72$

$0 \neq 27$

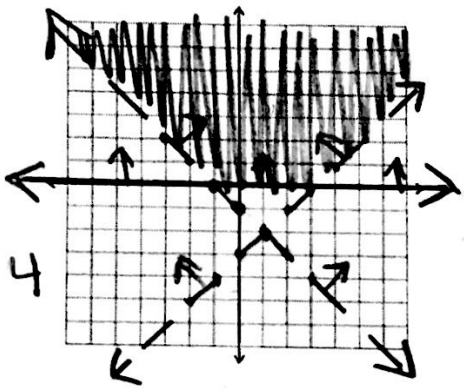
no solution

Graph the system of inequalities.

8.) $4x + 4y > -4$

$-2x + 2y > -4$

$y \geq 0$



$4x + 4y > -4$

$4y > -4x - 4$

$y > -x - 1$

$-2x + 2y > -4$

$2y > 2x - 4 \rightarrow y > x - 2$

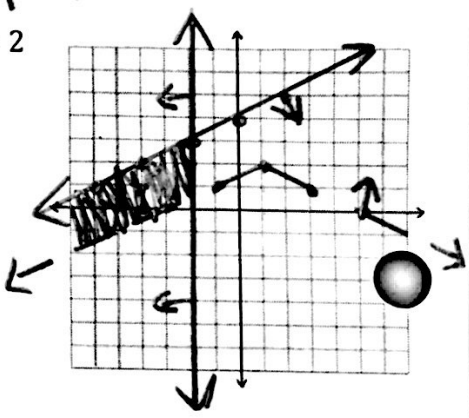
9.) $y > -\frac{1}{2}|x - 1| + 2$

$x \leq -2$

$y \leq \frac{1}{2}x + 4$

vertex: (1, 2)

↑ slope (arms): $-\frac{1}{2}$



Solve the linear system using any algebraic method.

10.) $8x - 2y + z = -6$

$-x + 3y - 2z = -15$

$3x - y + 4z = 13$

elim z

① $2(8x - 2y + z = -6)$

$+16x - 4y + 2z = -12$

② $-x + 3y - 2z = -15$

$15x - y = -27$

③ $2(-x + 3y - 2z = -15)$

$-2x + 6y - 4z = -30$

$+ \quad 3x - y + 4z = 13$

$x + 5y = -17$

$x + 5y = -17$

$5(15x - y = -27)$

$75x - 5y = -135$

$+ \quad x + 5y = -17$

$76x = -152$

$x = -2$

$(-2) + 5y = -17$

$5y = -15$

$y = -3$

$-(-2) + 3(-3) - 2z = -15$

$2 - 9 - 2z = -15$

$-2z = -8$

$z = 4$

solution $(-2, -3, 4)$

11.) $10x + 2y - 2z = 12$
$2x + 2y + 2z = 4$
$3x + y = 4 \rightarrow y = -3x + 4$

$10x + 2(-3x + 4) - 2z = 12$
$10x - 6x + 8 - 2z = 12$
$4x - 2z = 4$

$2x + 2(-3x + 4) + 2z = 4$
$2x - 6x + 8 + 2z = 4$
$-4x + 2z = -4$

$4x - 2z = 4$
$+ \quad -4x + 2z = -4$
$0 = 0$

solution: infinitely many

12.) A math test is to have 20 total questions. The test format uses multiple choice questions worth 4 points each, and problem solving questions that are worth 6 points each. The test is worth a total of 100 points.

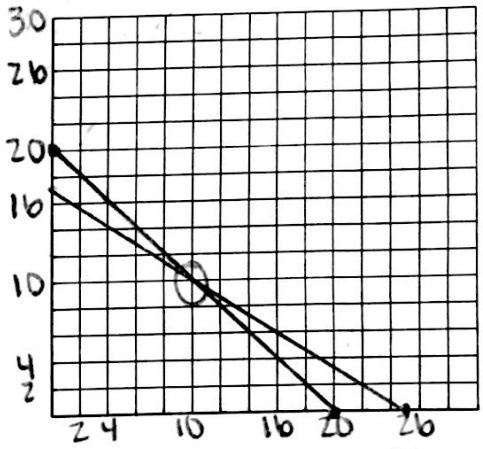
x = # of multiple choice questions
y = # of problem solving questions

a.) **Write a system of equations** to determine how many of each type of question is used. Be sure to **define your variables**.

$x + y = 20$
$4x + 6y = 100$

b.) **Solve your system by graphing**. Set your *x*- and *y*-axis to go by two. Be sure to check your solution.

$x + y = 20$ (0, 20) (20, 0)
$4x + 6y = 100$ (0, 16.7) (25, 0)



$10 + 10 = 20$
$20 = 20$ ✓
$4(10) + 6(10) = 100$
$40 + 60 = 100$
$100 = 100$ ✓

c.) How many of each type of question were on the test?

10 multiple choice
10 problem solving

13.) A hair salon receives a shipment of 84 bottles of hair conditioner to use and sell to customers. The two types of conditioners received are type A, which is used for regular hair, and type B, which is used for frizzy hair. Type A costs $6.50 per bottle and type B costs $8.25 per bottle. The hair salon's invoice for the conditioner is $588.

x = # of type A conditioner
y = # of type B conditioner

Set up and solve a system of equations to find how many of each type of conditioner are in the shipment. Remember to define your variables.

$x + y = 84 \longrightarrow x = 84 - y$
$6.5x + 8.25y = 588$

$6.5(84 - y) + 8.25y = 588$
$546 - 6.5y + 8.25y = 588$
$1.75y = 42$
$y = 24$

$x = 84 - 24$
$x = 60$

60 Type A
24 Type B

14.) In order to connect your Blueray player to your TV set, you need a cable with a special adapter at both ends. An 8 foot cable costs $24.50 and a 4 foot cable costs $15.50. The total cost is the sum of the cost of the adapters and the cost of the cable itself.

x = cost per ft.
y = cost for adapters

Set up and solve a system of equations to find the per foot cost of the cable and the fixed cost of the special adapters. Remember to define your variables.

$8x + y = 24.50$
$4x + y = 15.50$

$-1(8x + y = 24.50)$
$-8x - y = -24.50$
$+ 4x + y = 15.50$
$-4x = -9$

$x = \$2.25$

$8(2.25) + y = 24.50$
$9 + y = 24.50$
$y = \$6.50$

What would you expect to pay for a 6 foot cable?

$C = 6x + y$
$C = 6(2.25) + 6.50 = \$20$

15.) For an upcoming concert, a 2500 seat arena is selling tickets for $25 and $15. At least 1000 tickets must be priced at $15 and total sales need to exceed $10,000 to make a profi t. Let *x* represent the number of tickets priced at $25 and *y* represent the number of tickets priced at $15. **Write a system of inequalities** that shows the possible combinations of ticket sales in order to make a profit.

$x + y \leq 2500$
$25x + 15y \geq 10{,}000$
$y \geq 1000$
$x \geq 0$

x = # of $25 tickets
y = # of $15 tickets

16.) The movie theater charges different rates for attendees depending on their age; children 12 and under are $4, adults are $6 and senior citizens over 65 are $5. A group of 14 people from a family decides to go to the movies one weekend. There are an equal number of senior citizens as children 12 and under. The total cost was $66. Let *x* represent the number of children 12 and under. Let *y* represent the number of adults. Let *z* represent the number of senior citizens.

6 kids
2 Adults
3 Senior Citizens

Write and solve a system of linear equations in **three variables** to find the number of people in each age category in the group.

$x + y + z = 14 \rightarrow z + y + z = 14$
$2z + y = 14$
$4x + 6y + 5z = 66 \rightarrow 4z + 6y + 5z = 66$
$9z + 6y = 66$
$x = z$

$-6(2z + y = 14)$
$-12z - 6y = -84$
$+ \quad 9z + 6y = 66$
$-3z = -18$
$z = 6$

$x = 6$

$2(6) + y = 14$
$12 + y = 14 \rightarrow y = 2$

17.) A cashier has 25 coins consisting of nickels, dimes, and quarters with a value of $4.90. If the number of dimes is 1 less than twice the number of nickels, how many of each type of coin does she have?

3 nickels
5 dimes
17 quarters

x = # of nickels
y = # of dimes
z = # of quarters

$x + y + z = 25$
$.05x + .10y + .25z = 4.90$
$y = 2x - 1$

$x + (2x - 1) + z = 25$
$3x + z = 26$

$y = 2(3) - 1$
$y = 5$

$.05x + .10(2x - 1) + .25z = 4.90$
$.05x + .20x - .10 + .25z = 4.90$
$-4(.25x + .25z = 5)$
$+ \quad -x - z = -20$
$\quad 3x + z = 26$

$2x = 6$
$x = 3$

$3 + 5 + z = 25$
$8 + z = 25$
$z = 17$