Algebra 1: Chapter 6 Test Review Name _____ Period _____
Systems of Equations

Define each of the following terms. Use your notes if you need help.

p.370 1. System of Linear Equations - 2 or more equations that define a relationship between quantities.

p.368 2. Break-Even Point – when cost = income.

List three methods of solving systems of linear equations and briefly describe how you use each one.

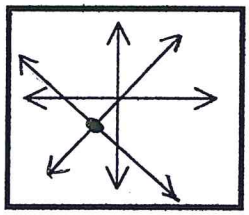
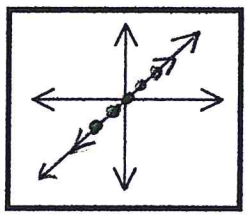
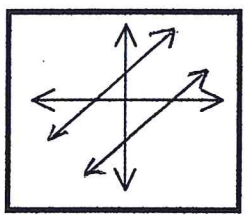
3. Graphing is a method of solving a system of equations where both equations are graphed on the same coordinate plane to find the point-of-intersection.

p.370 4. Substitution is a method of solving a system of equations where a variable in 1 equation is replaced by its value or an equivalent expression in the other equation.

p.388 5. Linear combinations is a method of solving a system of equations where two equations are added together to eliminate a variable.

6. **Sketch the graph of a system of linear equations that represents each type of solution. Then, choose the appropriate description of the system of equations.**

notes

a. One Solution	b. Infinite Solutions	c. No Solution
		
Circle one:	**Circle one:**	**Circle one:**
Slope: same or (different)	**Slope:** (same) or different	**Slope:** (same) or different
***y*-intercept:** same or (different)	***y*-intercept:** (same) or different	***y*-intercept:** same or (different)
Soln: (consistent) or inconsistent	**Soln:** (consistent) or inconsistent	**Soln:** consistent or (inconsistent)

7. **Write each equation in slope-intercept form ($y = mx + b$).**

a. $4x - 6y = 12$

$-4x \quad -4x$

$\frac{-6y}{-6} = \frac{-4x}{-6} + \frac{12}{-6}$

$y = \frac{4}{6}x - 2$

or

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

b. $x = 10 - 5y$

$-10 \quad -10$

$\frac{x - 10}{-5} = \frac{-5y}{-5}$

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

or

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

c. $3x - 7y - 19 = 0$

$-3x \quad -3x$

$-7y - 19 = -3x$

$+19 \quad +19$

$\frac{-7y}{-7} = \frac{-3x}{-7} + \frac{19}{-7}$

$y = \frac{3}{7}x - \frac{19}{7}$

8. **Determine the best method (graphing, substitution, or linear combinations/elimination) for solving each system of linear equations.**

a. $-2x+3y=8$, $4x-3y=12$ — Add the 2 EQs to get rid of "y"

b. $x=3y-6$, $3x+5y=9$ — Replace "x" with the equivalent expression.

c. $y=5x+8$, $y=-2x+6$ — Slope-intercept is easy to graph.

a. Linear combinations/ Elimination

b. Substitution

c. Graphing

9. **Clear the fractions! Then, solve each system of linear equations by any method.**

a. $\frac{3}{4}x+\frac{1}{2}y=\frac{1}{4}$, $\frac{2}{3}x+\frac{1}{6}y=\frac{1}{2}$

$4\left[\frac{3}{4}x+\frac{1}{2}y=\frac{1}{4}\right]$

$3x+2y=1$

$6\left[\frac{2}{3}x+\frac{1}{6}y=\frac{1}{2}\right]$

$4x+y=3$

Use substitution:

$4x+y=3$

$-4x \quad -4x$

$y=-4x+3$

$y=(-4x+3)$

$3x+2y=1$

$3x+2(-4x+3)=1$

$3x-8x+6=1$

$-5x+6=1$

$-6 \quad -6$

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

$x=1$

$y=-4(1)+3$

$y=-1$

$(1,-1)$

b. $3y-x=-2$, $y-\frac{1}{3}x=2$

$3\left[y-\frac{1}{3}x=2\right]$

$3y-x=6$

$-1[3y-x=-2]$

$-3y+x=2$

Use elimination

$3y-x=6$

$-3y+x=2$

$0\neq 8$

No solution

10. **Write a system of linear equations to represent the problem situation. Then, the graph the system to estimate the break-even point. Explain what the break-even point represents.**

Claire sells jewelry at a local market. Each piece of jewelry costs (C) $10.00 to make, and she has to pay (C) $40 for a booth at the market. She sells (I) each piece of jewelry for $20.

Income equation: $y=$ $20x$

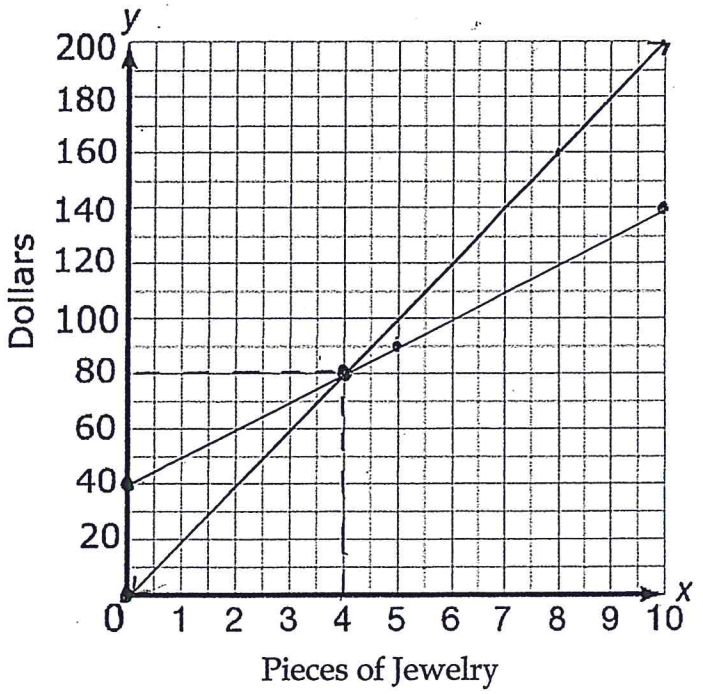
Cost/Expense equation: $y=$ $10x+40$

x	y
0	40
5	90
10	140

Break-even point: (4, 80)

Meaning:

Claire will break-even when she sells 4 pieces of jewelry. Her income and her cost/expense will both be $80.



Write a system of linear equations to represent each problem situation. Then, solve the system using any method. Write your solution as an ordered pair. slope-intercept form / initial cost + rate

11. Ticketmaster offers two ticket plans for sporting events. One plan costs \$120 plus \$25 per ticket. The other plan costs \$40 per ticket. How many tickets must Marc buy so the first plan is the same price as the second plan? rate

x = # of tickets

Equation 1: $y = 25x + 120$

Equation 2: $y = 40x$

Solution: $(8, 320)$

$y = 25x + 120$ Use substition!

$y = 40x$

$25x + 120 = 40x$

$-25x \quad -25x$

$120 = 15x$

$\frac{120}{15} = \frac{15x}{15}$

$8 = x$

$y = 40(8) = 320$

Marc must buy 8 tickets so the first plan and the second plan both cost \$320.

12. Jeremy and Tamira are making chicken noodle soup. Jeremy opens 4 large cans and 6 small cans of soup and pours them into a soup pot. His pot contains 114 ounces of soup. Tamira opens 3 large cans and 5 small cans of soup. Her pot contains 91 ounces of soup. How many ounces of soup does each large can and each small can contain? total

total standard form

Equation 1: $4x + 6y = 114$

Equation 2: $3x + 5y = 91$

Solution: $(12, 11)$

x = # of ounces of soup in a large can

y = # of ounces of soup in a small can

Use elimination!

$3[4x + 6y = 114]$

$12x + 18y = 342$

$-4[3x + 5y = 91]$

$-12x - 20y = -364$

$+12x + 18y = 342$

$-2y = -22$

$\frac{-2y}{-2} = \frac{-22}{-2}$

$y = 11$

$4x + 6(11) = 114$

$4x + 66 = 114$

$4x + 66 = 114$

$-66 \quad -66$

$4x = 48$

$\frac{4x}{4} = \frac{48}{4}$

$x = 12$

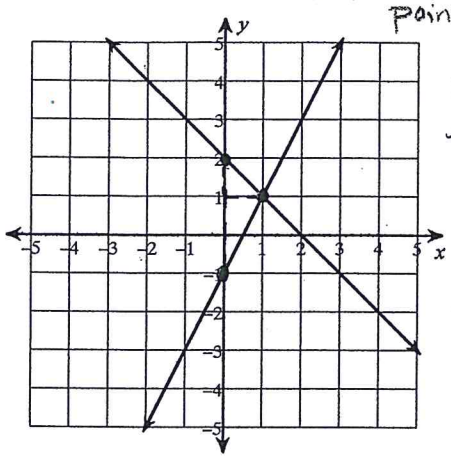
A large can contains 12 ounces and a small can contains 11 ounces.

Use a ruler!

Solve each system of equations by graphing. If there is one solution, write as an ordered pair.

13) $y = 2x + 1$
$y = -x + 2$

Start with the y-intercept
Use $\frac{\text{rise}}{\text{run}}$ to find the next point.



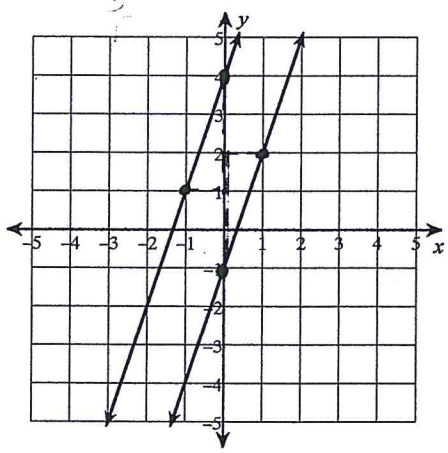
$y = 2x - 1$
$m = \frac{2}{1}$, $b = -1$

$y = -x + 2$
$m = \frac{-1}{1}$, $b = 2$

(1, 1)

14) $y = 3x + 4$
$y = 3x - 1$

$y = 3x + 4$
$m = \frac{3}{1}$, $b = 4$

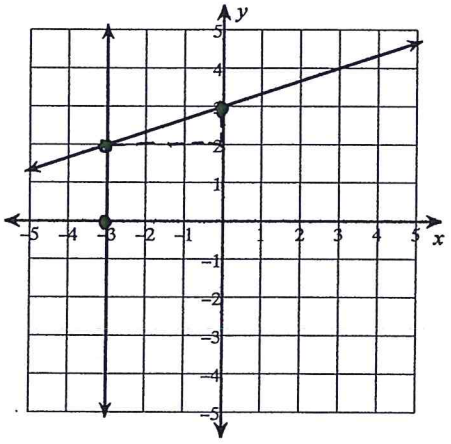


$y = 3x - 1$
$m = \frac{3}{1}$, $b = -1$

No solution

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

$y = \frac{1}{3}x + 3$
$m = \frac{1}{3}$, $b = 3$



(–3, 2)

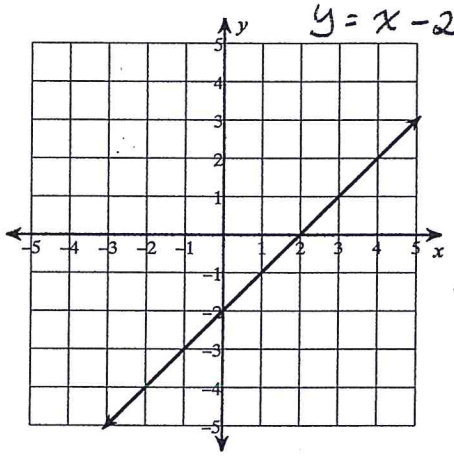
16) $-x + 2 = -y$
$-y = 2 - x$

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

$x - 2 = y$
$y = x - 2$

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

$y = -2 + x$
or
$y = x - 2$



same line

$m = \frac{1}{1}$, $b = -2$

Infinite number of solutions

Solve each system of equations using substitution. If there is one solution, write as an ordered pair.

17) $y = -5x - 20$
$y = 3x + 4$
(–3, –5)

$y = -5x - 20$
$y = 3x + 4$

$-5x - 20 = 3x + 4$
$-3x \quad -3x$
$-8x - 20 = 4$
$+20 \quad +20$
$-8x = 24$
$\frac{-8x}{-8} = \frac{24}{-8}$
$x = -3$

$y = 3(-3) + 4$
$y = -9 + 4$
$y = -5$

18) $7x - 3y = 13$
$y = 5$
(4, 5)

$y = 5$
$7x - 3y = 13$
$7x - 3(5) = 13$
$7x - 15 = 13$
$+15 \quad +15$
$\frac{7x}{7} = \frac{28}{7}$
$x = 4$

19) $-x + 2y = 13$
$y = -3x - 11$

(–5, 4)

$y = (-3x - 11)$

$-x + 2y = 13$

$-x + 2(-3x - 11) = 13$

$-x - 6x - 22 = 13$

$-7x - 22 = 13$

$+22 \quad +22$

$\frac{-7x}{-7} = \frac{35}{-7}$

$x = -5$

$y = -3(-5) - 11$

$y = 15 - 11$

$y = 4$

20) $y = -7x - 6$
$-14x - 2y = -7$

No solution

$y = (-7x - 6)$

$-14x - 2y = -7$

$-14x - 2(-7x - 6) = -7$

$-14x + 14x - 6 = -7$

$-6 \neq -7$

Solve each system using linear combinations. If there is one solution, write as an ordered pair.

21) $-4x + 3y = 7$
$10x - 3y = -13$

(–1, 1)

$-4x + 3y = 7$

$+ 10x - 3y = -13$

$\frac{6x}{6} = \frac{-6}{6}$

$x = -1$

$-4(-1) + 3y = 7$

$4 + 3y = 7$

$-4 \quad -4$

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

$y = 1$

22) $14x - 2y = 22$
$7x - y = 11$

Infinite number of solutions

$-2[7x - y = 11]$

$-14x + 2y = -22$

$14x - 2y = 22$

$0 = 0$

23) $2x - 2y = -6$
$-6x + 6y = 12$

No solution

$3[2x - 2y = -6]$

$6x - 6y = -18$

$+ -6x + 6y = 12$

$0 \neq -6$

24) $-4x - 5y = 8$
$3x - 4y = -6$

(–2, 0)

$3[-4x - 5y = 8]$

$-12x - 15y = 24$

$4[3x - 4y = -6]$

$12x - 16y = -24$

$+ -12x - 15y = 24$

$\frac{-31y}{-31} = \frac{0}{-31}$

$y = 0$

$-4x - 5(0) = 8$

$-4x = 8$

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

$x = -2$