Name:_____ Date:_____

Chapter 9: Solving Systems of Linear Equations Algebraically Foundations and Pre-Calculus 10

9.1 Solving Systems by Substitution P 475 #1,3, 4, 6, 7, 8, 9, 11, 13, 14, 17, 18, 19, 20, 25 *21, 22, 24	I am now able to

9.2 Solving Systems by Elimination P 488 #1, 3, 5, 7, 8, 9, 11, 12, 13, 14, 21 *15, 17	I am now able to

9.3 Solving Problems Using Linear Systems P 498 #1, 3 – 11, 14 *12, 13	I am now able to

9.4 Review P502 #1-13 P 504 Practice Test	Vocabulary Questions I expect to see on the test

Chapter 9 Test	Strengths Needing improvement

9.1 Warmup

1. Write each equation in the form $y = mx + b$.

a) $3y = 6x + 15$

$\frac{3y}{3} = \frac{6x}{3} + \frac{15}{3}$

$y = 2x + 5$

b) $2x - 5y = 7$

$+5y \quad -7$

$5y = 2x - 7$

$\frac{5y}{5} = \frac{2x}{5} - \frac{7}{5}$

$y = \frac{2}{5}x - \frac{7}{5}$

c) $-4x + y - 3 = 0$

$y = 4x + 3$

2. When you double Jamie's age and add 10, you get her mother's age. Write a mathematical expression that shows the mother's age. Tell what your variable represents.

x = jamies age

y = mothers age

$y = 2x + 10$

3. The following chart reveals the number of circles in a pattern.

Term Number	1	2	3	4
Number of Circles	1	3	5	7

a) How many circles would exist for term number 5?

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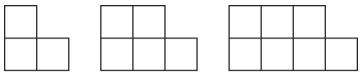
b) Write a mathematical expression that would allow you to determine the number of circles for any term.

$y = 2x - 1$

4. The diagram shows a pattern of small squares.



a) Construct a chart showing the term number and the increasing number of small squares in the pattern.

x	1	2	3	4	5
y	3	5	7	9	11

b) How could you determine the number of small squares in the seventh term?

$y = 2(7) + 1$

$y = 15$

c) Write an algebraic expression showing the total number of small squares, where t represents the term number.

$y = 2x + 1$

$2x+3 = -3x-2$

$+3x \quad -3 \qquad +3x \quad -3$

$5x = -5$

$x = -1$

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

$y = 2y-6+4$

$y = 2y-2$

$-2y \quad -2y$

$-y = -2$

$y = +2$

$a \neq b \qquad b = 10$

$a = 10$

$y = 2x+3$

$y = -x+4$

$2x+3 = -x+4$

$+x \qquad +x$

$3x+3 = 4$

$3x = 1$

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

$y = 2\left(\frac{1}{3}\right)+3$

$= \frac{2}{3}+3$

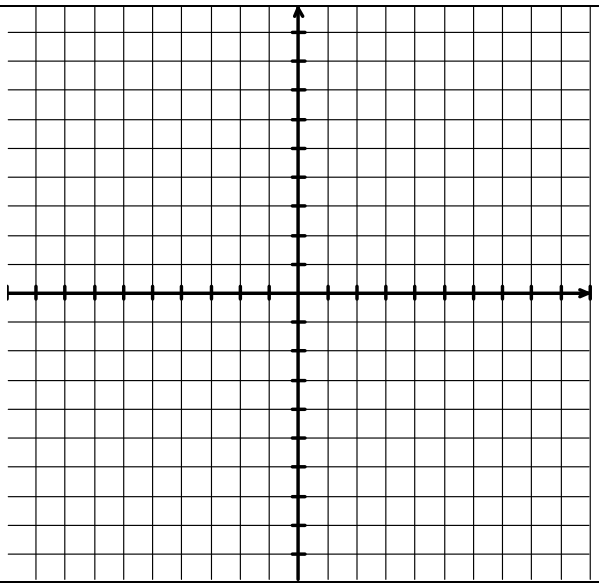
$= 3\frac{2}{3}$ or $\frac{11}{3}$

$(x,y) = \left(\frac{1}{3}, \frac{11}{3}\right)$

Foundations & Pre-Calculus 10

9.1 Solving Linear Systems by Sustitution

Solve the following system graphically

$3x + 2y = 6$ $y - 6 = 2x$	

What are some of the advantages of a graphical approach?

you can see what quadrant the solution is in, you can see approximate answer

What are some of the disadvantages of a graphical approach?

many answers/solutions have decimals and can't be read easily on a graph.

There are several different type of algebraic approaches to solving a system, one of which is called the **substitution method**.

To use this method, you begin by solving for one of the variables in one of the equations (or isolate one of the variables in one equation)

In this example, it would probably be easiest to solve for ___y___ in the ___y-6= 2x___ equation.	$3x + 2y = 6$ $y - 6 = 2x$ +6 +6 $y = 2x + 6$

Now substitute this expression for y in the other equation.	$3x+2y=6$ $3x+2(2x+6)=6$ $3x+4x+12=6$ $-12\quad -12$ $7x=-6$
This now gives you one equation with only _____ variable. Solve this equation for the remaining variable.	$x=\frac{-6}{7}$
Determine the value of the other variable by substituting this variable into one of the two equations.	$y=2x+6$ $y=2(\frac{-6}{7})+6$ $y=\frac{-12}{7}+6$ $y=\frac{-12}{7}+\frac{42}{7}$ $y=\frac{30}{7}$ $(x,y)=(\frac{-6}{7},\frac{30}{7})$

How can you check your answer?

Check by substituting solution into both equations.

$3(\frac{-6}{7})+2(\frac{30}{7})=6$

$\frac{-18}{7}+\frac{60}{7}=6$

$\frac{42}{7}=6$ ✓

Example 2.: Solve $\begin{cases} x+2y=10 \\ 3y-5x=41 \end{cases}$

In this example, it would probably be easiest to solve for _x_ in the _$x+2y=10$_ equation.

$x=10-2y$

$3y-5(10-2y)=41$

$3y-50+10y=41$

$13y=91$

$y=7$

$x=10-2(7)$

$x=10-14$

$x=-4$

$(x,y)=(-4,7)$

$y = 2x + 1$

$y = 2x + 3$

$2x+1 = 2x+3$

$-2x \quad -2x$

$1 = 3$

$y = 2x+1$

$y = 2x+1$

$2x+1 = 2x+1$

$-2x \quad -2x$

$1 = 1$

or

$0 = 0$

Example 3: On a school ski trip, the cost for lift tickets for 1 teacher and 18 students was $390. The cost for 3 teachers and 25 students was $590. What was the cost for an individual teacher and student lift ticket? (The cost for individual teacher lift tickets is different than for individual student lift tickets)

x: teacher cost

y: student cost.

$x + 18y = 390$

$3x + 25y = 590$

p475 #1, 3, 4, 6-9, 11, 13, 14, 17-20, 25

* 21, 22, 24

9.1 Extra Practice

1. Solve the following systems of linear equations by substitution. Verify your answers.

a) $2x - 3y + 17 = 0$

$y = -5x$

b) $4x + y = 1$

$x = 2y - 20$

c) $y = -5x - 8$

$y = 4x + 1$

2. Solve the following systems of linear equations by substitution by first isolating x.

a) $x + y = 9$

$-10x + 6y = 6$

b) $x - 3y = 4$

$5x - 7y = 4$

c) $2x + 3y = 20$

$6x - y = 20$

3. Solve the following systems of linear equations by substitution by first isolating y.

a) $x - y = -2$

$-2x + y = 7$

b) $-3x + y = -3$

$5x - 2y = 10$

c) $2x + 3y = 20$

$6x - y = 20$

4. Compare your work for #2c) and 3c). Which method did you prefer for solving? Why?

5. Solve the following systems of linear equations by substitution.

a) $0.4x + y = 6$

$1.2x - 5y = 18$

b) $x + 0.03y = 10$

$10.4x + 0.75y = 980$

c) $5x - 0.5y = 31$

$2.5x + 3y = 9$

6. Solve the following systems of linear equations by substitution.

a) $8x + y - 2 = 0$

$3x + \frac{1}{4}y = 0$

b) $\frac{x}{2} + \frac{y}{3} = 6$

$3x - 2y = 12$

c) $\frac{x}{6} + \frac{y}{2} = 2$

$\frac{-x}{5} - \frac{y}{3} = 0$

7. Use the following system of linear equations to complete parts a) to c):

$2x - y = -7$

$3x + 2y = 5$

a) Solve the system by drawing a graph.

b) Solve the system by substitution.

c) Compare your answers to parts a) and b). What is the advantage of the algebraic approach?

8. Maria has a total of 20 nickels and quarters. She has four times as many nickels as quarters. How much money does Maria have?

9. The perimeter of a rectangle is 48 cm. The width is one third the length. Determine the dimensions of the rectangle.

10. A number is 12 less than one third of another number. Their sum is 56. What are the numbers?

9.1 Extra Practice Solutions

1. a) $x = -1$ and $y = 5$ **b)** $x = -2$ and $y = 9$
c) $x = -1$ and $y = -3$

2. a) $x = 3$ and $y = 6$ **b)** $x = -2$ and $y = -2$
c) $x = 4$ and $y = 4$

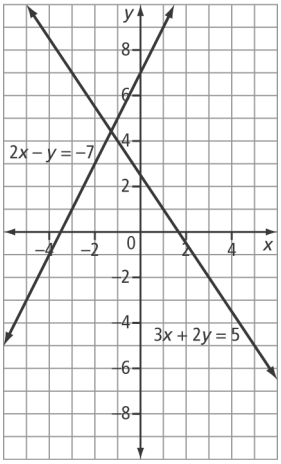
3. a) $x = -5$ and $y = -3$ **b)** $x = -4$ and $y = -15$
c) $x = 4$ and $y = 4$

4. Example: The algebra is easier to do when you isolate y.

5. a) $x = 15$ and $y = 0$ **b)** $x = -50$ and $y = 2000$
c) $x = 6$ and $y = -2$

6. a) $x = -0.5$ and $y = 6$ **b)** $x = 8$ and $y = 6$
c) $x = -15$ and $y = 9$

7. a)



Approximate solution: (–1.25, 4.5)

b) $x = -\frac{9}{7}$ and $y = \frac{31}{7}$ **c)** The answers are approximately the same, but the algebraic method gives the exact value.

8. $1.80 **9.** 6 cm by 18 cm **10.** 5 and 51