Name ______________________ Date __________ Class __________

LESSON 9-9

Problem Solving

The Quadratic Formula and the Discriminant

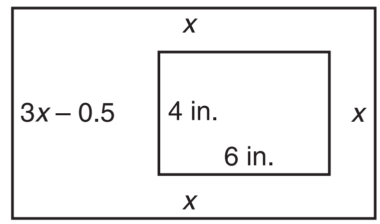
Write the correct answer.

1. Theo's flying disc got stuck in a tree 14 feet from the ground. Theo threw his shoe up at the disc to dislodge it. The height in feet h of the shoe is given by the equation $h = -16t^2 + 25t + 6$, where t is the time in seconds. Determine whether the shoe hit the disc. Use the discriminant to explain your answer.

____

____

2. A picture frame holds a 4-in. by 6-in. photograph. The frame adds a border x inches wide around three sides of the photo. On the fourth side the frame forms a border that is $3x - 0.5$ in. wide.



The combined area of the photograph and the frame is 80.5 in^2. Write a quadratic equation for the combined area. Then use the quadratic formula to find x.

____

____

3. The manager of a park enclosed an area for small dogs to play. He made the length 15 feet longer than the width and enclosed an area covering 1350 square feet. What are the dimensions of the dogs' play area?

____

The equation $-5x^2 + 72x + 378$ models the number of students enrolled in a school where x is the number of years since the school first opened in 1990. Select the best answer.

4. How many students did the school have when it opened?

A 68

B 72

C 378

D 445

5. Which equation can be used to find the year in which 502 students were enrolled?

F $-5x^2 + 72x + 502 = 0$

G $-5x^2 + 72x - 124 = 0$

H $-5x^2 + 72x - 502 = 0$

J $-5x^2 + 72x + 124 = 0$

6. In which year were 502 students enrolled?

A 1992 **C** 1998

B 1996 **D** 2002

7. In which year were 598 students enrolled?

F 1995 **H** 2000

G 1998 **J** 2010

8. Which statement is true?

A Enrollment exceeded 650 students at one point.

B Enrollment never exceeded 650 students.

C The highest enrollment of any year was exactly 650 students.

D There were two years where 650 students were enrolled.

Name ______________________________ Date __________ Class __________

LESSON **3-2**

Reteach

Using Algebraic Methods to Solve Linear Systems

To use the **substitution method** to solve a system of linear equations:

1. Solve one equation for one variable.
2. Substitute this expression into the other equation.
3. Solve for the other variable.
4. Substitute the value of the known variable in the equation in Step 1.
5. Solve for the other variable.
6. Check the values in both equations.

$$\begin{cases} y = x + 2 \\ 2x + y = 17 \end{cases}$$

Use this equation. It is solved for y.

Use the substitution method when the coefficient of one of the variables is 1 or -1.

$2x + y = 17$

$2x + (x + 2) = 17$ *Substitute $x + 2$ for y.*

$3x + 2 = 17$ *Simplify and solve for x.*

$3x = 15$

$x = 5$

Substitute $x = 5$ into $y = x + 2$ and solve for y: $y = x + 2$

$y = 5 + 2$

$y = 7$

The solution of the system is the ordered pair $(5, 7)$.

Check using both equations: $y = x + 2$; $7 \stackrel{?}{=} (5) + 2$; $7 = 7$✓

$2x + y = 17$; $2(5) + 7 \stackrel{?}{=} 17$; $17 = 17$✓

Use substitution to solve each system of equations.

1. $\begin{cases} y = 2x - 5 \\ 3x + y = 10 \end{cases}$

Use $y = 2x - 5$.

$3x +$ ________ $= 10$

____

____

____

Ordered pair solution: ______________

2. $\begin{cases} 3x + 2y = 1 \\ x - y = 2 \end{cases}$

Solve for x: $x - y = 2$.

$x =$ ______________

$3($________$) + 2y = 1$

____

____

Ordered pair solution: ______________

Name ______________________________ Date __________ Class __________

LESSON 3-2

Reteach

Using Algebraic Methods to Solve Linear Systems (continued)

To use the **elimination method** to solve a system of linear equations:
1. Add or subtract the equations to eliminate one variable.
2. Solve the resulting equation for the other variable.
3. Substitute the value for the known variable into one of the original equations.
4. Solve for the other variable.
5. Check the values in both equations.

$$\begin{cases} 3x + 2y = 7 \\ 5x - 2y = 1 \end{cases}$$

The y terms have opposite coefficients, so add.

Use the elimination method when the coefficients of one of the variables are the same or opposite.

$$\begin{array}{r} 3x + 2y = 7 \\ +\ 5x - 2y = 1 \\ \hline 8x \qquad = 8 \\ x = 1 \end{array}$$

Add the equations.

Solve for x.

Substitute $x = 1$ into $3x + 2y = 7$ and solve for y: $3x + 2y = 7$

$$3(1) + 2y = 7$$
$$2y = 4$$
$$y = 2$$

The solution to the system is the ordered pair $(1, 2)$.

Check using both equations:

$3x + 2y = 7$	$5x - 2y = 1$
$3(1) + 2(2) \stackrel{?}{=} 7$	$5(1) - 2(2) \stackrel{?}{=} 1$
$7 = 7$ ✓	$1 = 1$ ✓

Use elimination to solve each system of equations.

3. $\begin{cases} 2x + y = 1 \\ -2x - 3y = 5 \end{cases}$

$$\begin{array}{r} 2x + y = 1 \\ +(-2x - 3y = 5) \\ \hline \end{array}$$

$-2y =$ ____

$y =$ ____

____

Ordered pair solution: ______________

4. $\begin{cases} 3x + 4y = 13 \\ 5x - 4y = -21 \end{cases}$

$$\begin{array}{r} 3x + 4y = 13 \\ +\ 5x - 4y = -21 \\ \hline \end{array}$$

____

$x =$ ____

____

Ordered pair solution: ______________

LESSON 3-2

Practice A

Using Algebraic Methods to Solve Linear Systems

Use substitution to solve each system of equations.

1. $\begin{cases} y = x - 3 \\ x + 2y = 6 \end{cases}$

a. Substitute $x - 3$ for y in $x + 2y = 6$. Then solve the equation for x.

$x = 4$

b. Substitute your value for x in $y = x - 3$ and solve for y.

$y = 1$

c. Write the solution as an ordered pair. $(4, 1)$

2. $\begin{cases} x = 5 - y \\ 2x + 5y = 16 \end{cases}$ $(3, 2)$

3. $\begin{cases} y = 3x + 2 \\ 2x + 3y = 17 \end{cases}$ $(1, 5)$

4. $\begin{cases} x - y = 2 \\ y = 4x + 1 \end{cases}$ $(-1, -3)$

Use elimination to solve each system of equations.

5. $\begin{cases} 4x - 5y = 7 \\ 3x - 4y = 6 \end{cases}$

a. Multiply the first equation by -3 and the second equation by 4.

$\begin{cases} -12x + 15y = -21 \\ 12x - 16y = 24 \end{cases}$

b. Add the two equations, which eliminates x. Solve for y.

$y = -3$

c. Substitute your value for y into the first equation. Solve for x.

Write the solution as an ordered pair. $(-2, -3)$

6. $\begin{cases} 5x + y = 19 \\ -2x - y = -7 \end{cases}$ $(4, -1)$

7. $\begin{cases} -x + 3y = 12 \\ 6x - y = -21 \end{cases}$ $(-3, 3)$

8. $\begin{cases} 2x + 3y = 4 \\ 4x - 2y = -8 \end{cases}$ $(-1, 2)$

LESSON 3-2

Practice B

Using Algebraic Methods to Solve Linear Systems

Use substitution to solve each system of equations.

1. $\begin{cases} x = 7y - 4 \\ 2x - 3y = 14 \end{cases}$ $(10, 2)$

2. $\begin{cases} y - 3x = 5 \\ 2x = 3y + 6 \end{cases}$ $(-3, -4)$

3. $\begin{cases} 3x - 4y = 20 \\ y - 2x = 0 \end{cases}$ $(-4, -8)$

Use elimination to solve each system of equations.

4. $\begin{cases} x + 6y = 1 \\ 3x + 5y = -10 \end{cases}$ $(-5, 1)$

5. $\begin{cases} 3x + 4y = 6 \\ 2x + 3y = 3 \end{cases}$ $(6, -3)$

6. $\begin{cases} 3x - 5y = 1 \\ 2x + 3y = -12 \end{cases}$ $(-3, -2)$

Use substitution or elimination to solve each system of equations.

7. $\begin{cases} x + y = 13 \\ 2x - 3y = 1 \end{cases}$ $(8, 5)$

8. $\begin{cases} 9x + 2y = 5 \\ 3x - y = -10 \end{cases}$ $(-1, 7)$

9. $\begin{cases} 2x + y = 1 \\ x = 5 + y \end{cases}$ $(2, -3)$

10. $\begin{cases} x = -8y \\ x + y = 14 \end{cases}$ $(16, -2)$

11. $\begin{cases} 2x + 4y = 12 \\ -3x + 3y = 63 \end{cases}$ $(-12, 9)$

12. $\begin{cases} 5x - 2y = -1 \\ 3x - y = -2 \end{cases}$ $(-3, -7)$

Solve.

13. Bill leaves his house for Makayla's house riding his bicycle at 8 miles per hour. At the same time, Makayla leaves her house heading toward Bill's house walking at 3 miles per hour.

a. Write a system of equations to represent the distance, d, each is from Makayla's house in h hours. They live 8.25 miles apart.

$\begin{cases} d = 8.25 - 8h \\ d = 3h \end{cases}$

b. Solve the system to determine how long they travel before meeting.

0.75 h or 45 min

LESSON 3-2

Practice C

Using Algebraic Methods to Solve Linear Systems

Use substitution or elimination to solve each system of equations.

1. $\begin{cases} x = y - 5.2 \\ 2x + 3y = 9.6 \end{cases}$ $(-1.2, 4)$

2. $\begin{cases} 3x - 4y = 5 \\ x = y + \frac{1}{2} \end{cases}$ $\left(-3, -3\frac{1}{2}\right)$

3. $\begin{cases} x + 4y = \frac{1}{4} \\ 4x - 3y = 39 \end{cases}$ $\left(8\frac{1}{4}, -2\right)$

4. $\begin{cases} 2x + 20y = 3 \\ 2x = -7y - 10 \end{cases}$ $\left(-8\frac{1}{2}, 1\right)$

5. $\begin{cases} x + y = 5 \\ 3x + 2y = 4 \end{cases}$ $(-6, 11)$

6. $\begin{cases} 3x + 4y = 35 \\ 4x - 2y = 21 \end{cases}$ $\left(7, 3\frac{1}{2}\right)$

7. $\begin{cases} 3\frac{1}{4}x + 3y = 42 \\ 5x = 4y \end{cases}$ $\left(6, 7\frac{1}{2}\right)$

8. $\begin{cases} 5x - 5y = 6 \\ 4x + 7y = -4 \end{cases}$ $\left(\frac{2}{5}, -\frac{4}{5}\right)$

9. $\begin{cases} 2x - 8y = 24 \\ x - 21 = 16y \end{cases}$ $\left(9, -\frac{3}{4}\right)$

Solve.

10. Cora bought 4 pounds of nuts and 2 pounds of raisins for \$23.50. Mark bought 2 pounds of nuts and 4 pounds of raisins for \$18.50.

a. Write a system of equations that represents the price of the nuts, n, and the price of the raisins, r. $\begin{cases} 4n + 2r = 23.5 \\ 2n + 4r = 18.5 \end{cases}$

b. Solve the system. How much should a pound of nuts and a pound of raisins cost together? \$7.00

11. Kate and Riley are reading the same book. Kate reads $\frac{1}{3}$ page per minute, and Riley reads $\frac{3}{4}$ page per minute. Kate has already read 70 pages, while Riley has read 30 pages. If they both resume reading together, eventually Riley will catch up to Kate.

a. On what page will that occur?

102

b. How many minutes have they read when Riley catches up?

96

LESSON 3-2

Reteach

Using Algebraic Methods to Solve Linear Systems

To use the **substitution method** to solve a system of linear equations:

1. Solve one equation for one variable.
2. Substitute this expression into the other equation.
3. Solve for the other variable.
4. Substitute the value of the known variable in the equation in Step 1.
5. Solve for the other variable.
6. Check the values in both equations.

$\begin{cases} y = x + 2 \\ 2x + y = 17 \end{cases}$

Use this equation. It is solved for y.

Use the substitution method when the coefficient of one of the variables is 1 or -1.

$2x + y = 17$

$2x + (x + 2) = 17$ *Substitute $x + 2$ for y.*

$3x + 2 = 17$ *Simplify and solve for x.*

$3x = 15$

$x = 5$

Substitute $x = 5$ into $y = x + 2$ and solve for y: $y = x + 2$

$y = 5 + 2$

$y = 7$

The solution of the system is the ordered pair $(5, 7)$.

Check using both equations: $y = x + 2$; $7 \stackrel{?}{=} (5) + 2$; $7 = 7$✓

$2x + y = 17$; $2(5) + 7 \stackrel{?}{=} 17$; $17 = 17$✓

Use substitution to solve each system of equations.

1. $\begin{cases} y = 2x - 5 \\ 3x + y = 10 \end{cases}$

Use $y = 2x - 5$.

$3x + \underline{2x - 5} = 10$

$5x - 5 = 10$

$x = 3$

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

Ordered pair solution: $(3, 1)$

2. $\begin{cases} 3x + 2y = 1 \\ x - y = 2 \end{cases}$

Solve for x: $x - y = 2$.

$x = \underline{y + 2}$

$3(\underline{y + 2}) + 2y = 1$

$y = -1$

$x = -1 + 2 = 1$

Ordered pair solution: $(1, -1)$

LESSON **3-2**

Reteach

Using Algebraic Methods to Solve Linear Systems (continued)

To use the **elimination method** to solve a system of linear equations:

1. Add or subtract the equations to eliminate one variable.
2. Solve the resulting equation for the other variable.
3. Substitute the value for the known variable into one of the original equations.
4. Solve for the other variable.
5. Check the values in both equations.

Use the elimination method when the coefficients of one of the variables are the same or opposite.

The y terms have opposite coefficients, so add.

$$\begin{cases} 3x + 2y = 7 \\ 5x - 2y = 1 \end{cases}$$

$$\begin{array}{rl} 3x + 2y = 7 & \\ +\ 5x - 2y = 1 & \textit{Add the equations.} \\ \hline 8x \quad\ \ = 8 & \textit{Solve for } x. \\ x = 1 & \end{array}$$

Substitute $x = 1$ into $3x + 2y = 7$ and solve for y: $3x + 2y = 7$

$$3(1) + 2y = 7$$
$$2y = 4$$
$$y = 2$$

The solution to the system is the ordered pair $(1, 2)$.

Check using both equations:

$$\begin{array}{ll} 3x + 2y = 7 & 5x - 2y = 1 \\ 3(1) + 2(2) \stackrel{?}{=} 7 & 5(1) - 2(2) \stackrel{?}{=} 1 \\ 7 = 7 \checkmark & 1 = 1 \checkmark \end{array}$$

Use elimination to solve each system of equations.

3. $\begin{cases} 2x + y = 1 \\ -2x - 3y = 5 \end{cases}$

$$\begin{array}{r} 2x + y = 1 \\ +(-2x - 3y = 5) \\ \hline \end{array}$$

$-2y =$ **6**

$y =$ **−3**

x = 2

Ordered pair solution: **(2, −3)**

4. $\begin{cases} 3x + 4y = 13 \\ 5x - 4y = -21 \end{cases}$

$$\begin{array}{r} 3x + 4y = 13 \\ +\ 5x - 4y = -21 \\ \hline \end{array}$$

8x = −8

$x =$ **−1**

y = 4

Ordered pair solution: **(−1, 4)**

LESSON **3-2**

Challenge

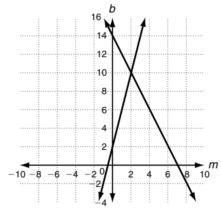
Using Linear Systems to Find the Equation of a Line

Linear systems of equations can be used to find the equation of a line. Determine the equation of the line passing through points $(-4, 2)$ and $(2, 14)$ using $y = mx + b$. Substituting the x- and y-coordinates for the values of x and y in the slope-intercept form of the line gives the system.

$$\begin{cases} 2 = -4m + b \\ 14 = 2m + b \end{cases}$$

Solve this system to find the slope and y-intercept of the line passing through points $(-4, 2)$ and $(2, 14)$. Finding $m = 2$ and $b = 10$ from the table or the graph allows you to write the equation of the line $y = 2x + 10$.

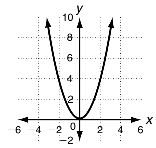
	$2 = -4m + b$	$14 = 2m + b$
m	b	b
0	2	14
1	6	12
2	10	10
3	14	8
4	18	6



Use a system of equations to find the equation of the line passing through the given points.

1. $(5, 7)$ and $(1, 19)$ **y = −3x + 22**
2. $(-2, 4)$ and $(2, 8)$ **y = x + 6**
3. $(3, -5)$ and $(5, 1)$ **y = 3x − 14**
4. $(1, 1)$ and $(5, -9)$ **y = −2.5x + 3.5**
5. $(-1, 8)$ and $(1, -8)$ **y = −8x**

The equation of a parabola in standard form is $y = ax^2 + bx + c$. There are three constants, a, b, and c. Three points not on a line will determine a unique parabola.



Find the equation of the parabola passing through the given points.

6. $(0, 1)$, $(1, 0)$, and $(2, 1)$ **$y = x^2 - 2x + 1$**
7. $(1, 5)$, $(2, 4)$, and $(4, 8)$ **$y = x^2 - 4x + 8$**

LESSON **3-2**

Problem Solving

Using Algebraic Methods to Solve Linear Systems

Shanae mixes feed for various animals at the zoo so that the feed has the right amount of protein. Feed X is 18% protein. Feed Y is 10% protein. Use this data for Exercises 1–4.

1. How much of each feed should Shanae mix to get 50 lb of feed that is 15% protein?
   a. Write a linear system of equations. **$\begin{cases} 0.18x + 0.10y = (0.15)50 \\ x + y = 50 \end{cases}$**
   b. Solve the system. How much of each feed should she mix?

   31.25 lb of Feed X and 18.75 lb of Feed Y

2. Shanae has 15 lb of Feed Y left. She wants to make a mixture that is 12% protein. She needs to know how much of Feed X to use, and how much of the mixture she can make.
   a. Write a linear system of equations. **$\begin{cases} 0.18x + (0.10)(15) = (0.12)z \\ x + 15 = z \end{cases}$**
   b. How much of Feed X should she use? **5 lb of Feed X**
   c. How much of the mixture will she make? **20 lb of the mixture**

Choose the letter for the best answer.

3. Raul mixes 12 lb of Feed X with 20 lb of Feed Y. Which equation gives the percent of protein (c) in the mixture?

   A $12(0.18) + 20(0.10) = 32c$
   B $32[12(0.18) + 20(0.10)] = c$
   C $12(0.18) + 20(0.10) = c$
   D $[12(0.18) + 20(0.10)]c = 32$

4. Alonzo needs to know how much of Feed X and Feed Y to mix to get 25 lb of a mixture that is 12% protein. Which equation can be used as part of a system of equations to find the solution?

   A $(0.10 + 0.18)(x + y) = (0.12)25$
   B $(0.18)x + (0.10)y = (0.12)25$
   C $25(0.18 + 0.10) = (0.12)x$
   D $10 + 18 = (0.12)25$

5. Billie reorders Feed X and Feed Y. Feed X costs \$58 per 100 lb. Feed Y costs \$45 per 100 lb. The order comes to \$470 for 900 lb. How much of each did she order?

   A Feed X: 350 lb; Feed Y: 550 lb
   B Feed X: 400 lb; Feed Y: 500 lb
   C Feed X: 450 lb; Feed Y: 540 lb
   D Feed X: 500 lb; Feed Y: 400 lb

6. Shanae earns \$8.00 per hour during the daytime and \$9.50 per hour in the evenings after 6 P.M. Last week she earned \$314.00 for 37 hours. How many daytime and evening hours did she work?

   A 35 daytime; 2 evening
   B 30 daytime; 7 evening
   C 25 daytime; 12 evening
   D 20 daytime; 17 evening

LESSON **3-2**

Reading Strategies

Understand Vocabulary

There are two ways you can solve a system of equations algebraically.

Substitution

Use substitution when you can easily solve one equation for one variable.

Memory tip: You can *substitute* salad for fries with your order.

For the system $\begin{cases} x - y = 4 \\ 2x - 3y = 7 \end{cases}$ it is easy to solve $x - y = 4$ for x:

$x = \boxed{4 + y}$

Then *substitute* for x in the second equation and solve for y:

$2x - 3y = 7$

$2(\boxed{4 + y}) - 3y = 7$

$8 + 2y - 3y = 7$

$-y = -1$ or $y = 1$

Finally, solve for x:

$x = 4 + y$

$x = 4 + 1 = 5$

The solution to the system is $(5, 1)$.

Elimination

Use elimination to add or subtract equations to remove one of the variables.

Memory tip: The Tigers were *eliminated* from the basketball tournament.

For the system $\begin{cases} 5x - 2y = -9 \\ 3x + 2y = 1 \end{cases}$ if you add the 2 equations together, the y-term is *eliminated* because $-2y + 2y = 0$.

Addition gives $8x = -8$, so $x = -1$.

Finally, solve for y.

$3x + 2y = 1$

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

$-3 + 2y = 1$

$2y = 1 + 3 = 4$

$y = 2$

The solution to the system is $(-1, 2)$.

Tell which method you would use to solve each system of equations and explain why.

1. $\begin{cases} 2x + y = 3 \\ 3x + 4y = 9 \end{cases}$ **Possible answer: substitution because I can easily solve the first equation for *y***

2. $\begin{cases} 3x - 4y = 9 \\ -3x + 5y = -9 \end{cases}$ **Possible answer: elimination because I can eliminate *x* from the system by adding the two equations together**

3. $\begin{cases} -2x + 5y = 3 \\ x - 2y = 0 \end{cases}$ **Possible answer: substitution because I can easily solve the second equation for *x***

4. $\begin{cases} 3x - y = -1 \\ 4x + \frac{1}{2}y = 1 \end{cases}$ **Possible answer: elimination because I can eliminate *y* from the system by multiplying the second equation by 2, then adding the equations**

Name ______________________ Date __________ Class __________

LESSON 12-7

Reteach

Solving Rational Equations

A **rational equation** is an equation that contains one or more rational expressions. Some rational equations are proportions and can be solved using cross products. Solutions to all rational equations must be checked.

Solve $\frac{4}{x-3} = \frac{2}{x}$.

$\frac{4}{x-3} \times \frac{2}{x}$

$4(x) = 2(x-3)$ *Multiply.*

$4x = 2x - 6$ *Distribute.*

$-2x \quad -2x$ *Add $-2x$ to both sides.*

$2x = -6$

$\frac{2x}{2} = \frac{-6}{2}$ *Divide.*

$x = -3$ *Simplify.*

Check:

$\frac{4}{x-3}$	$= \frac{2}{x}$
$\frac{4}{(-3)-3}$	$\frac{2}{(-3)}$
$\frac{4}{-6}$	$\frac{2}{-3}$
$-\frac{2}{3}$	$-\frac{2}{3}$ ✓

The solution is -3.

Solve $\frac{x-4}{x^2-4} = \frac{-2}{x-2}$.

$\frac{x-4}{x^2-4} \times \frac{-2}{x-2}$

$(x-4)(x-2) = -2(x^2-4)$

$x^2 - 6x + 8 = -2x^2 + 8$

$+2x^2 \qquad +2x^2$

$3x^2 - 6x + 8 = 8$

$-8 \quad -8$

$3x^2 - 6x = 0$

$3x(x-2) = 0$ *Zero Product Property*

$x = 0$ or $x = 2$

Check:

$\frac{x-4}{x^2-4}$	$= \frac{-2}{x-2}$	$\frac{x-4}{x^2-4}$	$= \frac{-2}{x-2}$
$\frac{(0)-4}{(0)^2-4}$	$\frac{-2}{(0)-2}$	$\frac{(2)-4}{(2)^2-4}$	$\frac{-2}{(2)-2}$
$\frac{-4}{-4}$	$\frac{-2}{-2}$	$\frac{-2}{0}$	$\frac{-2}{0}$ ✗
1	1 ✓	undefined	

The only solution is 0.

Solve. Check your answer.

1. $\frac{3}{x+2} = \frac{4}{x+1}$ ____________

2. $\frac{x}{6} = \frac{x}{x+4}$ ____________

3. $\frac{5}{x+3} = \frac{6}{x+1}$ ____________

4. $\frac{2x}{6} = \frac{x}{x+1}$ ____________

5. $\frac{8}{x^2-64} = \frac{1}{x-8}$ ____________

6. $\frac{x+2}{x-2} = \frac{4}{x-4}$ ____________

Reteaching Linear Systems in Context

Example Problem:

A perfume is made from t ounces of 15% scented Thalia and b ounces of 40% Thalia. You want to make 60 oz of a perfume that has a 25% blend of the Thalia. How many ounces of each concentration of Thalia are needed to get 60 oz of perfume that is 25% strength of Thalia?

Write your systems of equations:
$$60(0.25) = 0.15t + 0.4b$$
$$60 = t + b$$

Solve the system by using substitution:

$60(0.25) = 0.15t + 0.4b$	Solve the second equation for t and substitute in the first equation.
$15 = 0.15(60 - b) + 0.4b$	Substitute $60 - b$ for t in the first equation.
$15 = 9 - 0.15b + 0.4b$	Distributive property
$24 = b$	Solve for b.

Substitute 24 for b in second equation to find that $t = 36$. The answer is (36, 24). The blend requires 36 oz of the 15% perfume and 24 oz of the 25% perfume.

Practice:

1. You have a coin bank that has 275 dimes and quarters that total $51.50. How many of each type of coin do you have in the bank?

3. You earn a fixed salary working as a sales clerk making $11 per hour. You get a weekly bonus of $100. Your expenses are $60 per week for groceries and $200 per week for rent and utilities. How many hours do you have to work in order to break even?

6. Multi-Step A skin care cream is made with vitamin C. How many ounces of a 30% vitamin C solution should be mixed with a 10% vitamin C solution to make 50 ounces of a 25% vitamin C solution?

- Define the variables.
- Make a table or drawing to help organize the information.