Ella and her friends spent $21.91 at Papa Gino's for
5 slices of pizza and 4 drinks.
Will and his friends bought 10 slices and
6 drinks for $39.84.

How much does a slice of pizza cost?

Let x = cost of 1 slice of pizza
Let y = cost of 1 drink

$$2[5x + 4y = 21.91] \Rightarrow 10x + 8y = 43.82$$
$$10x + 6y = 39.84 \quad - \quad 10x + 6y = 39.84$$

$$\frac{2y}{2} = \frac{3.98}{2}$$
$$y = 1.99$$

$$10x + 6y = 39.84$$
$$10x + 6(1.99) = 39.84$$
$$10x + 11.94 = 39.84$$
$$-11.94 \quad -11.94$$
$$\frac{10x}{10} = \frac{27.90}{10}$$
$$x = 2.79$$

Slice of
pizza costs
$2.79

Writing Word Problems As Systems of Equations and Solving

1. The sum of two numbers is -11. Twice the first number minus the second number is 32. Find the numbers.

Let $x = 1^{st}$ number $\begin{cases} x+y = -11 \\ 2x-y = 32 \end{cases}$
Let $y = 2^{nd}$ number

$$+ \quad \begin{array}{r} x+y = -11 \\ 2x-y = 32 \\ \hline \dfrac{3x}{3} = \dfrac{21}{3} \\ x = 7 \end{array}$$

$$\begin{array}{r} x+y = -11 \\ 7+y = -11 \\ -7 \qquad -7 \\ \hline y = -18 \end{array}$$

One number is 7 and the other is -18.

2. A collection of nickels and dimes is worth $3.30. There are 42 coins in all. How many of each kind of coin are there?

Let $x = $ # of nickels $\begin{cases} x+y = 42 \\ 5x+10y = 330 \end{cases}$
Let $y = $ # of dimes

$$10[x+y = 42] \quad \Rightarrow \quad 10x+10y = 420$$
$$5x+10y = 330 \qquad\qquad - \underline{5x+10y = 330}$$
$$\dfrac{5x}{5} = \dfrac{90}{5}$$
$$x = 18$$

$$\begin{array}{r} x+y = 42 \\ 18+y = 42 \\ -18 \qquad -18 \\ \hline y = 24 \end{array}$$

18 nickels and
24 dimes

3. One night a theater sold 548 movie tickets. An adult's ticket cost $6.50, and a child's ticket cost $3.50. In all, $2881 was taken in. How many of each kind of ticket were sold?

Let x = # of adult tickets

Let y = # of child tickets

$$\begin{cases} x + y = 548 \\ 6.5x + 3.5y = 2881 \end{cases}$$

$x + y = 548 \Rightarrow y = 548 - x$

$6.5x + 3.5y = 2881$

$6.5x + 3.5(548 - x) = 2881$

$6.5x + 1918 - 3.5x = 2881$

$\quad -1918 \qquad\qquad -1918$

$\dfrac{3x}{3} = \dfrac{963}{3}$

$x = 321$

$x + y = 548$

$321 + y = 548$

$-321 \qquad -321$

$y = 227$

321 Adult and 227 child tickets were sold.

4. The perimeter of a rectangular field is 110 feet. The length is 7 feet more than twice the width. Find the dimensions of the field. → dimensions are length and width

Let x = length of the field

Let y = width of the field

$$\begin{cases} 2x + 2y = 110 \\ x = 2y + 7 \end{cases}$$

$2x + 2y = 110$

$x = 2y + 7 \Rightarrow$

$2x + 2y = 110$

$x - 2y = 7$

$\dfrac{3y}{3} = \dfrac{117}{3}$ wait

$\dfrac{3y}{3} = \dfrac{117}{3}$

$x = 39$

$x = 2y + 7$

$39 = 2y + 7$

$-7 \qquad -7$

$\dfrac{32}{2} = \dfrac{2y}{2}$

$16 = y$

The field is 39 feet long and 16 feet wide.

5. A second run movie theater charges $4 for an adult ticket and $2 for a child's ticket. One night, 380 tickets were sold for a total of $1320. How many children attended the movie that night?

Let x = # of adult tickets
Let y = # of child tickets

$$\begin{cases} x+y=380 \\ 4x+2y=1320 \end{cases}$$

$$2[x+y=380]$$
$$4x+2y=1320$$
$$\Rightarrow \quad 2x+2y=760$$
$$- \quad 4x+2y=1320$$
$$\overline{\qquad\qquad}$$
$$\frac{2x}{2}=\frac{560}{2}$$
$$x=280$$

$$x+y=380$$
$$280+y=380$$
$$-280 \qquad -280$$
$$\overline{\qquad\qquad}$$
$$y=100$$

280 Adult tickets and 100 child tickets.

6. The state fair is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. High School A rented and filled 8 vans and 8 buses with 240 students. High School B rented and filled 4 vans and 1 bus with 54 students. Every van had the same number of students in it as did every bus. Find the number of students in each van and each bus.

Let x = # of students/van
Let y = # of students/bus

$$\begin{cases} 8x+8y=240 \\ 4x+y=54 \end{cases}$$

$$8x+8y=240$$
$$2[4x+y=54]$$
$$\Rightarrow$$
$$8x+8y=240$$
$$8x+2y=108$$
$$\overline{\qquad\qquad}$$
$$\frac{6y}{6}=\frac{132}{6}$$
$$y=22$$

$$4x+y=54$$
$$4x+22=54$$
$$-22 \quad -22$$
$$\overline{\qquad\qquad}$$
$$\frac{4x}{4}=\frac{32}{4}$$
$$x=8$$

8 students/van and 22 students/bus.

7. An orange has 20 fewer calories than a banana. If 7 bananas have the same number of calories as 9 oranges, how many calories are there in a banana?

Let x = # of calories in an orange

Let y = # of calories in a banana

$$\begin{cases} x = y - 20 \\ 7x = 9y \end{cases}$$

$x = y - 20$

$7y = 9x$ $\Longrightarrow$ $7y = 9(y-20)$

$7y = 9y - 180$

$\underline{-9y \quad -9y}$

$\dfrac{-2y}{-2} = \dfrac{-180}{-2}$

$y = 90$

$x = y - 20$

$x = 90 - 20$

$x = 70$

There are 70 calories in an orange and 90 calories in a banana.

8. Alexis bought pizza and soda for the ski club meeting. For one meeting she bought 4 pizzas and 10 sodas for $63. The next meeting she bought 3 pizzas and 8 sodas for $48. What is the cost of one pizza?

Let x = cost of one pizza

Let y = cost of a soda

$$\begin{cases} 4x + 10y = 63 \\ 3x + 8y = 48 \end{cases}$$

$3[4x + 10y = 63]$

$+[3x + 8y = 48]$ $\Longrightarrow$ $-$ $\begin{aligned} 12x + 30y &= 189 \\ 12x + 32y &= 192 \end{aligned}$

$\dfrac{-2y}{-2} = \dfrac{-3}{-2}$

$y = 1.5$

$3x + 8y = 48$

$3x + 8(1.5) = 48$

$3x + 12 = 48$

$\underline{-12 \quad -12}$

$\dfrac{3x}{3} = \dfrac{36}{3}$

$x = 12$

A pizza costs $12, a drink costs $1.50.

For the Unit Test you need to be able to:

1. write **and** graph equations for linear relationships in slope intercept form and standard form
2. determine the slope, x- and y-intercepts of linear equations
3. solve systems of equations by graphing
4. solve systems of equations algebraically
5. write system of equations from a word problem and solve

Classwork

IITS Practice Packet

To begin:

Complete the first problem on each page.

This is to make sure if you have any questions you are still in the classroom so I can answer them.

Then work through the packet.

Name _____ Date _____ Class _____

Additional Practice *(continued)*

2. The students at Susan B. Anthony Middle School wanted to encourage people to buy tickets to the spring musical early. Tickets purchased at the door cost $6, and tickets purchased in advance only cost $4. Receipts from ticket sales totaled $2,000 and there were 410 tickets sold.

a. Use x to represent the number of tickets sold at the door and y to represent the number of tickets sold in advance. Write a system of equations that represent the reported information about receipts from ticket sales and the total number of tickets.

Let x =

Let y =

find the number of tickets sold at the door and the number of tickets sold in advance.

Skill: Writing Equations With Two Variables

1. The drama club sells 200 pounds of fruit to raise money. The fruit is sold in 5-pound bags and 10-pound bags.

   a. Write an equation to find the number of each type of bag that the club should sell.

                  find two different solution pairs for the equation.

2. The student council is sponsoring a carnival to raise money. Tickets cost $5 for adults and $3 for students. The student council wants to raise $450.

   a. Write an equation to find the number of each type of ticket they should sell.

3. Anna goes to a store to buy $70 worth of flour and sugar for her bakery. A bag of flour costs $5, and a bag of sugar costs $7.

   a. Write an equation to find the number of bags of each type Anna can buy.

4. You have $50 to spend on cold cuts for a party. Ham costs $5.99 per pound, and turkey costs $4.99 per pound. Write an equation to relate the number of pounds of each kind of meat you could buy.

Skill: Substitution Method for Linear Systems *(cont.)*

Solve each system of equations using substitution.

5. $3x - 2y = 0$
    $x + 2y = -8$

6. $2x + 4y = -6$
    $x - 3y = 7$

7. $5x - 3y = -4$
    $5x + 3y = -6$

8. $3x - y = 4$
    $2x + y = 16$

Skill: Combination Method for Linear Systems

Solve each system of equations by combination.

1. $x + 2y = 7$
$3x - 2y = -3$

2. $3x + y = 20$
$x + y = 12$

3. $5x + 7y = 77$
$5x + 3y = 53$

4. $2x + 5y = -1$
$x + 2y = 0$

Skill: Combination Method for Linear Systems *(cont.)*

Solve each system of equations by combination.

5. $3x + 6y = 6$
$2x - 3y = 4$

6. $2x + y = 3$
$-2x + y = 1$

7. $4x - y = 6$
$3x + 2y = 21$

8. $2x - 3y = -11$
$3x + 2y = 29$
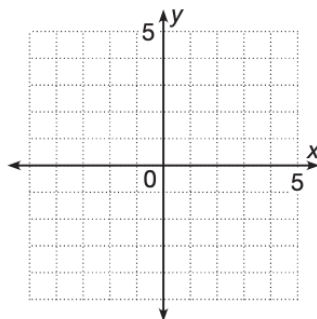
Name _____ Date _____ Class _____

Skill: Solving Linear Systems

Graph the pairs of equations. For each graph, estimate the point of intersection.
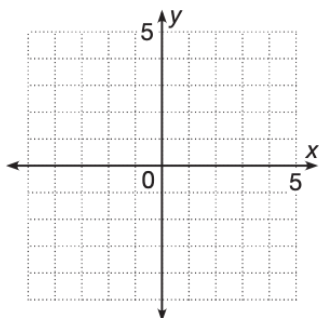
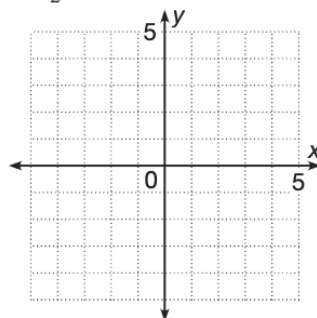**1.** $y = x + 2$
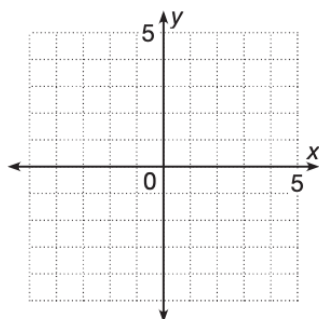 $y = 2x + 1$
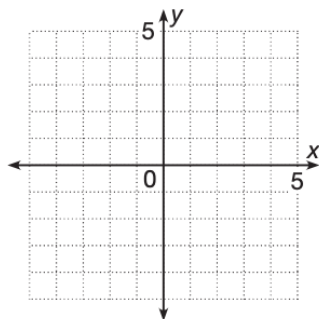
2. $y = -2x + 2$
   $y = 3x + 2$

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

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

5. $y = -\frac{3}{2}x + 2$
   $y = \frac{1}{2}x - 2$

6. $y = 2x - 5$
   $y = \frac{1}{4}x + 2$