

## Chapter 6 Linear Equations

Question: Is 1 a solution to  $3x + 4 = 7$ ? \_\_\_\_\_ why? \_\_\_\_\_

### SIMPLE EQUATIONS:

$$X - 3 = 2$$

$$-2 + X = 4$$

$$-3X = 15$$

$$\frac{X}{-2} = -3$$

Try:

$$X + 7 = 2$$

$$x - 5 = 4$$

$$8X = 24$$

$$-2 = \frac{X}{-7}$$

### BASIC EQUATIONS:

**1) Isolate the x**

(x's on one side, non x's on the other)  
(add and subtract)

**2) Divide**

(Divide by the number next to the variable)

$$3x + 6 \overset{|}{\underset{|}{\text{---}}} 18$$

$$-x - 5 \overset{|}{\underset{|}{\text{---}}} 7$$

Try:

a)  $3x + 5 = 8$

b)  $-4 = 5 - 3x$

## SIMPLIFYING A BASIC EQUATION:

S-I-D

### 1) Simplify

(simplify each side)

**i) Distribute/Multiply**

**ii) Combine like term**

### 2) Isolate the x

### 3) Divide

$$-2 + 3x + 8 = 18(-1)$$

$$5(x + 2) - 2x = 18 + 3$$

Try:

a)  $-2(3x + 5) = 8$

b)  $-4(-2) = 3 - (-5) - 3x$

## EQUATIONS WITH TWO OR MORE VARIABLES (Converting to a Basic equation)

### 1) Simplify

(simplify each side)

**i) Distribute/Multiply**

**ii) Combine like term**

### 2) Isolate the x (pick an x side)

### 3) Divide

$$3x + 8 = 2x + 12$$

$$5(x + 6) = 2x$$

Try:

a)  $-2x + 50 = 8x - 10$

b)  $-4x = 3(x + 7)$

## EQUATIONS INVOLVING FRACTIONS:

### 1) Simplify

(simplify each side)

#### i) Distribute/Multiply

#### ii) Combine like term

#### iii) Remove fractions ----- Multiply both sides by the LCD

### 2) Isolate the x

(pick an x side)

### 3) Divide

$$\frac{1}{3}x + \frac{5}{6} = \frac{3}{2}$$

$$\frac{2}{5}x - \frac{7}{15} = \frac{x}{3} + \frac{11}{5}$$

Try:

a)  $\frac{3h}{5} + 5 = -2 - x$

b)  $\frac{3}{5}x + 2 = \frac{x}{3} - \frac{1}{15}$

c)  $\frac{x}{4} + 3 = 7 - x$

### Phrases

The following four phrases show operations between two things. The create quantities, parenthesis:

The difference of 4 **and** 3  
( 4 - 3)

The sum of 4 **and** 3  
( 4 + 3)

The product of 4 **and** 3  
( 4 · 3)

The quotient of 4 **and** 3  
( 4 ÷ 3)

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The product of 4 plus 3 and 7 minus a number.  
( 4 + 3 ) · ( 7 - x )

The product of 4 plus 3 and 7, minus a number  
[( 4 + 3 ) · 7] - x

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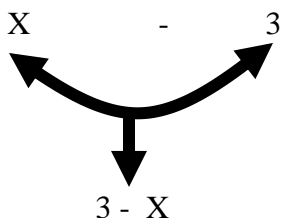
Example: four times the sum of five and six.

$$4 \cdot ( 5 + 6 ) \longrightarrow 4 ( 5 + 6 )$$

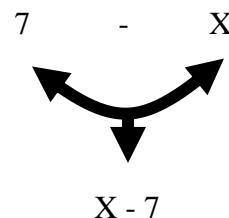
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### TWO SPECIAL CASES

A number subtracted from 3



7 less than a number



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Translate each phrase.

1. The product of 3 and a number **is** 4 more than the number
2. The sum of 7 and 8 is the number of dogs in a car.
3. 4 **subtracted from** 8 **is equal** to the product of a number and 3
4. The quotient of 6 and 3 **is equal** to a number plus 3
5. 8 times the sum of a number and 3 **is equal** to the same number
6. The difference between six times a number and four times the number is negative fourteen.

**For the following.**

**1) define the variable, 2) form a statement and equation, 3) solve and answer the question.**

1. In 1985, 595.4 billion cigarettes were smoked. This is 202.3 billion more cigarettes than were smoked in 2005. Find the number of cigarettes smoked in 2005.

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

2. In 2005, advertisers spent \$6.3 billion on outdoor advertising. This is \$3.7 billion more than advertisers spent in 1990. Find the amount that advertisers spent on outdoor advertising in 1990.

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

3. According to the Census Bureau , per capita state taxes collected in a recent year averaged \$2190. This represents two and one-half times the average per capita income tax collected that year. Find the average per capita income tax collected that year.

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

4. According to the Environmental Protection Agency, 58 million tons of waste was collected for recycling in 2005. This is 2 million tons less than twice the amount of waste collected for recycling in 1990. Find the amount of waste collected for recycling in 1990.

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

5. The total cost to paint the inside of a house was \$2692. This cost included \$250 for materials and \$66 per hour for labor. how many hours of labor were required?

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

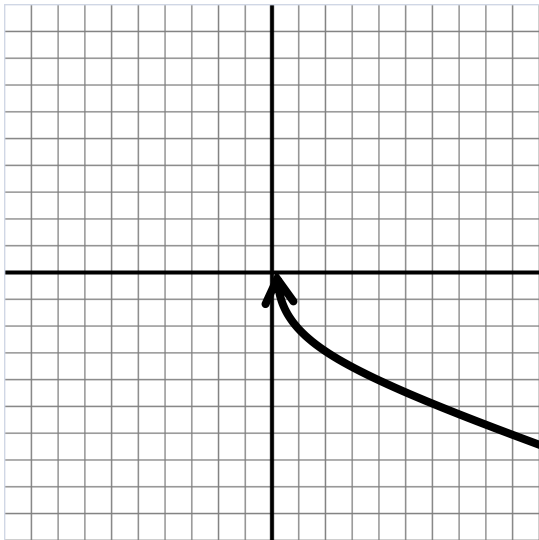
6. Seven thousand dollars is divided into two scholarships. Twice the amount of the first scholarship is \$1000 less than the amount of the larger scholarship. What is the amount of the larger scholarship?

1) Question:

2) Form a statement.

3) solve, answer, and say what this means.

RECTANGULAR COORDINATE SYSTEM



Plot  $(3,-2)$  ,  $(4,0)$  ,  $(0,0)$  ,  $(-5,0)$   $(0,6)$   
 $(-3,2)$  ,  $(-4,0)$  ,  $(0,1)$  ,  $(1,0)$   $(0,-6)$

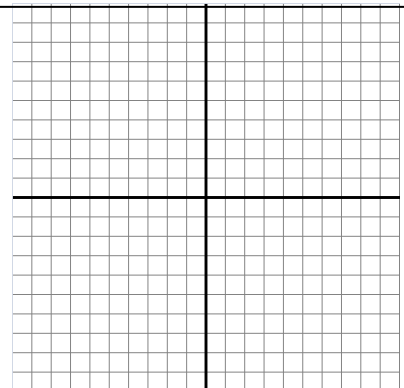
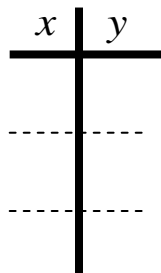
Is  $(3,4)$  a solutions to the equation  $x + y = 7$  ? \_\_\_\_\_

Complete the ordered pairs so that they are solutions of the equation

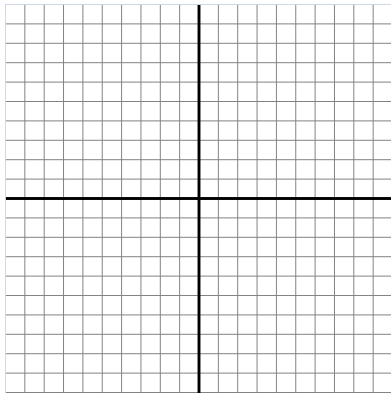
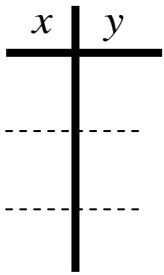
$2x + y = 8$      $(0, \quad)$   $(\quad, 0)$   $(\quad, 2)$

The coordinates that make the following equations true are called solutions to the equation.

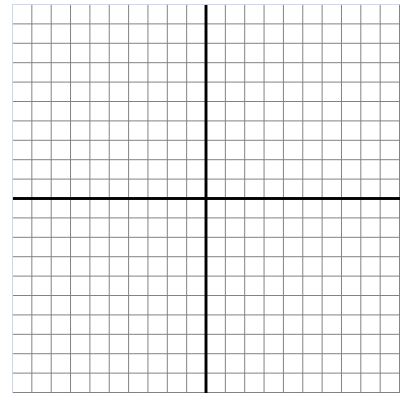
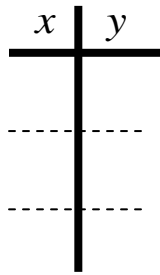
$x + y = 10$



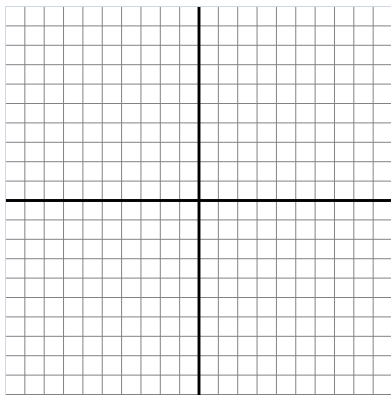
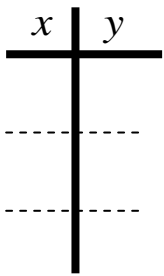
$$y = 2x + 3$$



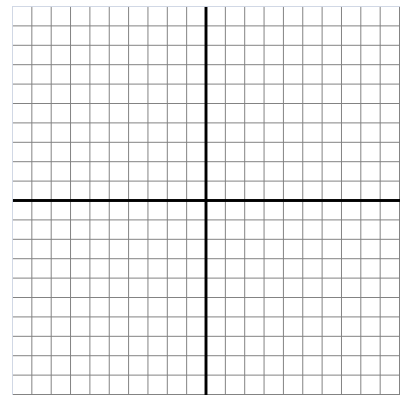
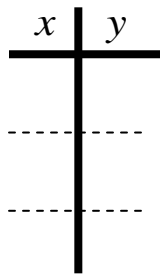
$$y = \frac{-1}{2}x + 1$$



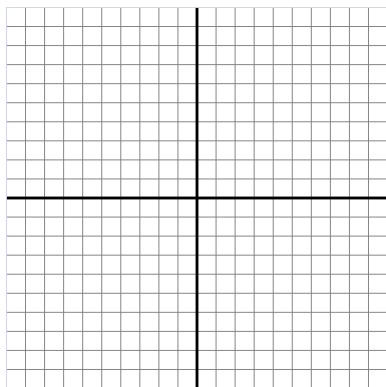
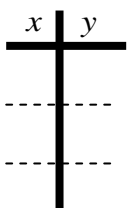
$$y = -5x - 2$$



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



$$y = -3$$



$$x = 5$$

