

# KEY POINTS

## Section 4.1

### What is a Function?

- **Function Notation**
- **Independent and Dependent Variables**
- **Evaluating Functions**
- **Using Units to Interpret Functions**
- **Representing Functions Using Tables and Graphs**

# Warm - Up

Section 4.1

What is a  
Function?

$$-5(x + 9) - 8 \geq 32$$

$$-5x - 45 - 8 \geq 32$$

$$-5x - 53 \geq 32$$

$$-5x \geq 85$$

$$x \leq -17$$

# Vocabulary

Section 4.1

What is a  
Function?

## Function Notation

Written as  $f(x)$  ; This does not mean multiplication

When we use this notation  $x$  represents the input value and  $f(x)$  represents the output value.

$x$  -- is also known as the independent variable, this value occurs no matter what

$f(x)$  -- is also known as the dependent variable, and needs the value of  $x$  in order to occur

# Discussion

Section 4.1

What is a  
Function?

The values for  $x$  and  $f(x)$  represent points in a plane.

$(x, f(x)) \rightarrow (x, y)$

There are various ways that we describe functions, we describe them in the following ways:

- words
- tables
- graphs
- formulas

# Examples

## Section 4.1

What is a  
Function?

**WORDS:** The population  $P$  of a town begins (in year  $t=0$ ) at 5000 people and grows by 250 people every year.

**TABLE:**

$t$	0	1	2	3	4	5
$P$	5000	5250	5500	5750	6000	6250

**FORMULA:**

Population = starting value + growth rate \* # of years  
 $P$                       5000                      250                       $t$

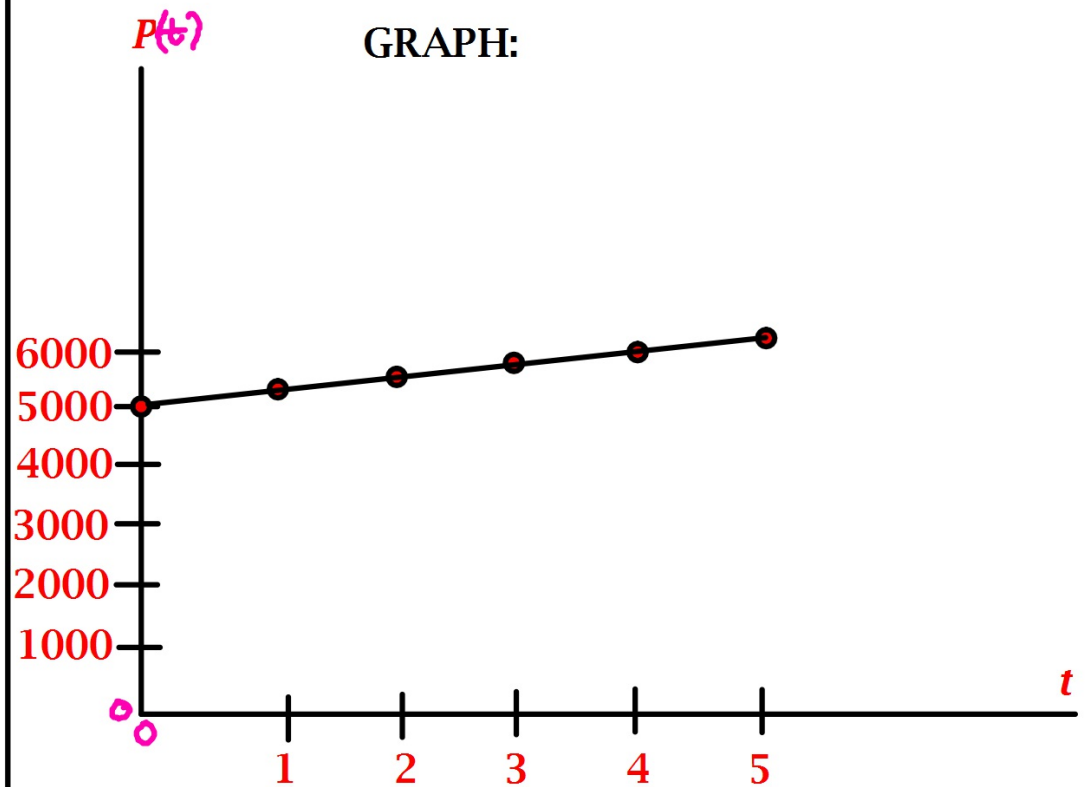
$$P = 5000 + 250t$$

# Examples

Section 4.1

What is a  
Function?

GRAPH:



# Examples

## Section 4.1

What is a  
Function?

Write the first 3 columns shown in the table using function notation.

$t$	0	1	2	3	4	5
$P$	5000	5250	5500	5750	6000	6250

$$P(0) = 5000$$

$$P(1) = 5250$$

$$P(2) = 5500$$

$$P(3) = 5750$$

# Examples

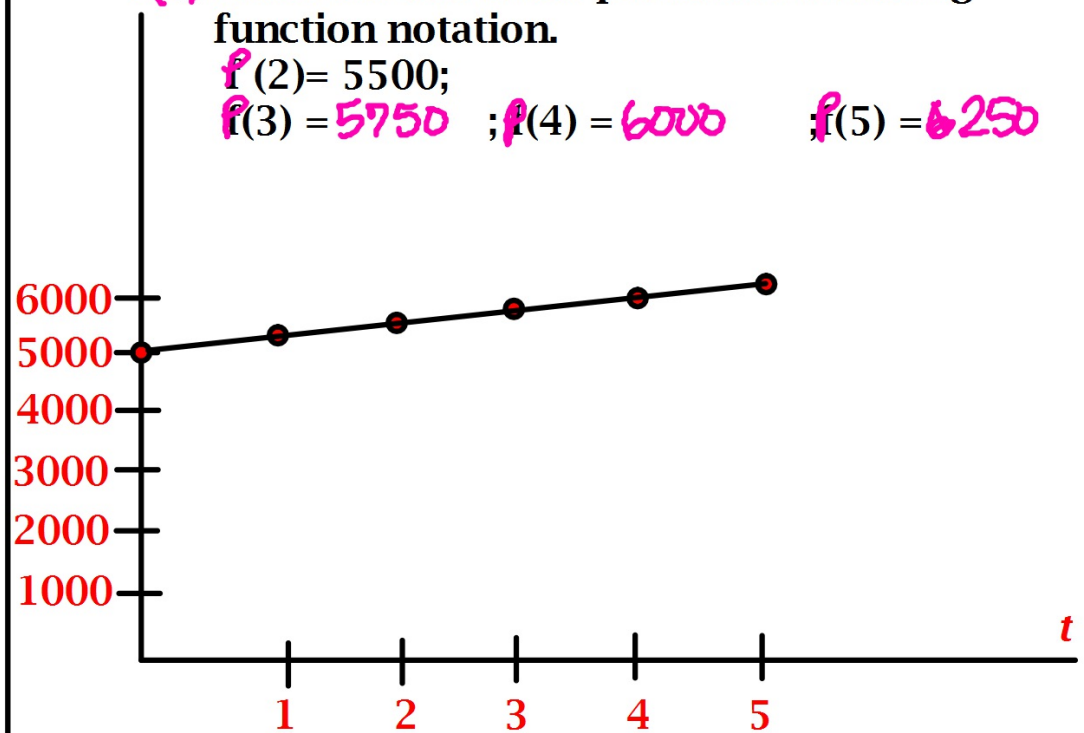
Section 4.1

What is a  
Function?

$P(t)$  Write the last three points shown using  
function notation.

$$P(2) = 5500;$$

$$P(3) = 5750 ; P(4) = 6000 ; P(5) = 6250$$





# Examples

## Section 4.1

### What is a Function?

If  $P(t) = 5000 + 250t$ , answer the following:

a.) Evaluate  $P(6)$

$$P(6) = 5000 + 250(6) = 5000 + 1500 = 6500$$

b.) Evaluate  $P(2.5)$

$$P(2.5) = 5625$$

c.) Given the  $P(10) = 7500$ , explain what the 10 represents and the 7500 represents.

$$10 = \text{time in years} \quad 7500 = \text{population}$$

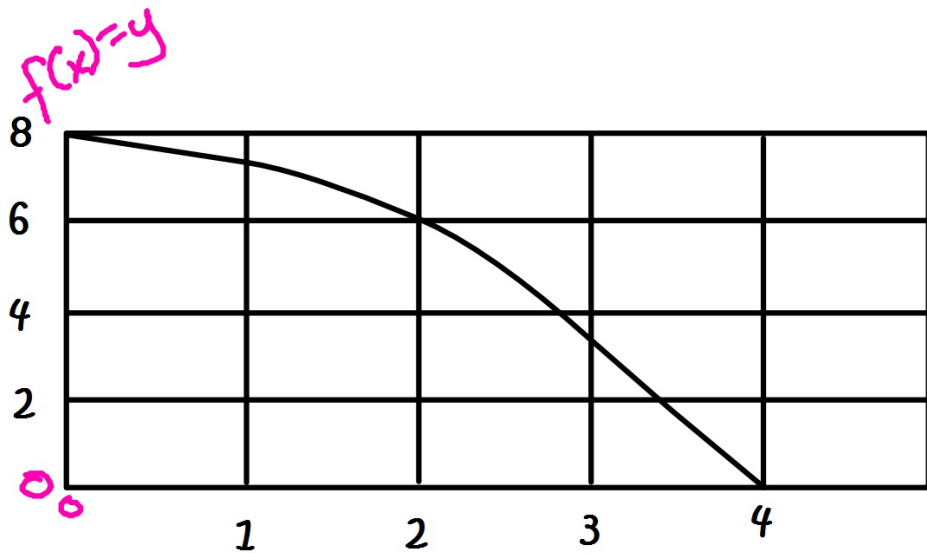
d.) Interpret the meaning of the statement  $P(10) = 7500$

In 10 years the population will be 7500.

# Examples

Section 4.1

What is a  
Function?



a.) Evaluate  $f(0)$ : 8

b.) Evaluate  $f(2)$ : 6

c.) Solve  $f(x) = 0$

$$x=4 \quad f(4)=0$$

d.) Solve  $f(x) = 2$

$$x=3.5$$

# Examples

Section 4.1

What is a  
Function?

Let  $f(x) = x^2$ . Evaluate and simplify the following.

a.  $f(-3) = (-3)^2 = 9$

b.  $f(2h) = (2h)^2 = (2h)(2h) = 4h^2$

c.  $f(x+1) = (x+1)^2 - (x+1)(x+1) = x^2 + 2x + 1$

d.  $f(x+1) - f(-3)$

$x^2 + 2x + 1 - 9$

$x^2 + 2x - 8$

# Homework

Pages 83  
#1-25 all, 32

