# AIS

#### Graphing from the Vertex Form

Let's use vertex form to reason about a graph.

## 16.1

#### Math Talk: When x Is -7

Evaluate each expression when x is -7, mentally.

- x + 4
- $(x+4)^2$
- $-(x+4)^2$
- $-(x+4)^2+5$

### 16.2

#### **Four Functions**

1. Complete the table of values for each function.

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

x	0	1	2	3	4	5	6	7
f(x)								

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

x	0	1	2	3	4	5	6	7
g(x)								

- 2. Use the completed tables to answer these questions:
  - a. What are the coordinates of the vertex of each graph? How can you tell?

- b. Does the graph of function f open up or down? How can you tell?
- c. Does the graph of function g open up or down? How can you tell?
- 3. Suppose function h is defined by  $h(x) = (x-4)^2 + 5$  and function j is defined by  $j(x) = -(x-4)^2 + 5$ . Make predictions about the graph of each function using the questions here. If you get stuck, try creating tables of values.
  - a. What are the coordinates of the vertex of the graphs of h and j?
  - b. Which way—up or down—does the graph of each function open? How do you know?

## 16.3 Four More Functions

Here are some tables of values that represent quadratic functions.

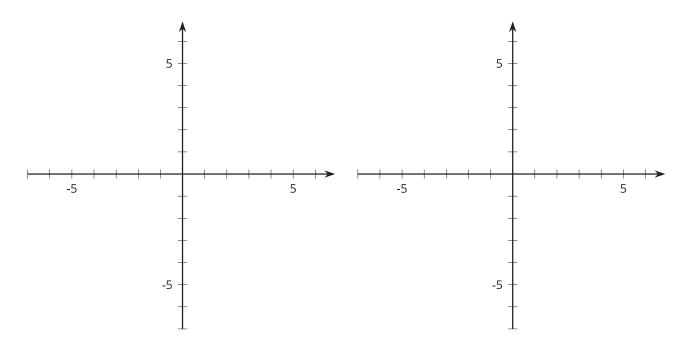
х	2	3	4	5	6	7	8
t(x)	-11	-2	1	-2	-11	-26	-47

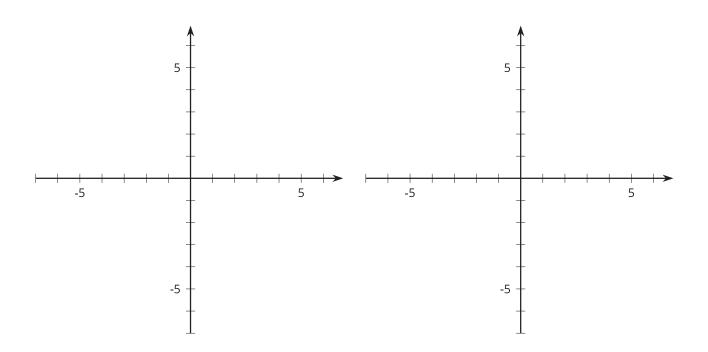
x	-2	-1	0	1	2	3	4
u(x)	13	4	1	4	13	28	49

х	-1	0	1	2	3	4	5
v(x)	76	49	28	13	4	1	4

x	-4	-3	-2	-1	0	1	2
w(x)	-47	-26	-11	-2	1	-2	-11

1. Make a rough sketch of a graph of each function. Label the vertex of each graph with its coordinates.





2. Here are some expressions that define quadratic functions. Match each function t, u, v, and w with an expression that defines it.

a. 
$$3x^2 + 1$$

b. 
$$-3(x-4)^2 + 1$$

c. 
$$3(x-4)^2 + 1$$

d. 
$$-3x^2 + 1$$