



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

- 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:
- What are the coordinates of the vertex of each graph? How can you tell?
 - Does the graph of function f open up or down? How can you tell?
 - 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.
- What are the coordinates of the vertex of the graphs of h and j ?
 - 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.

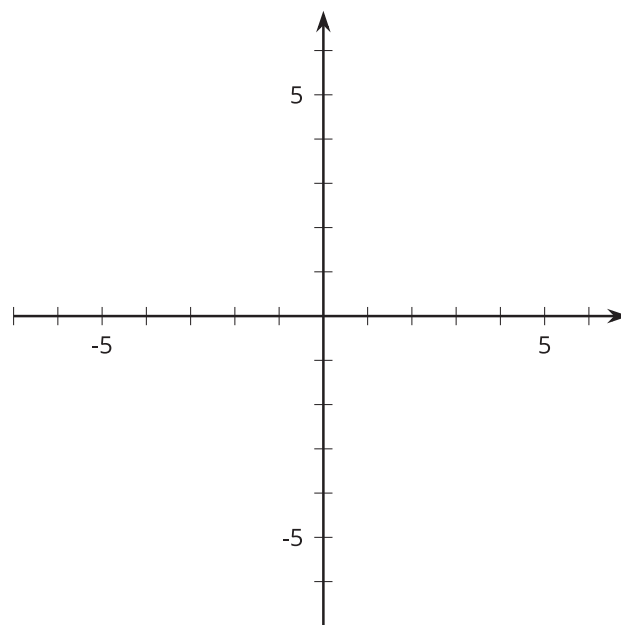
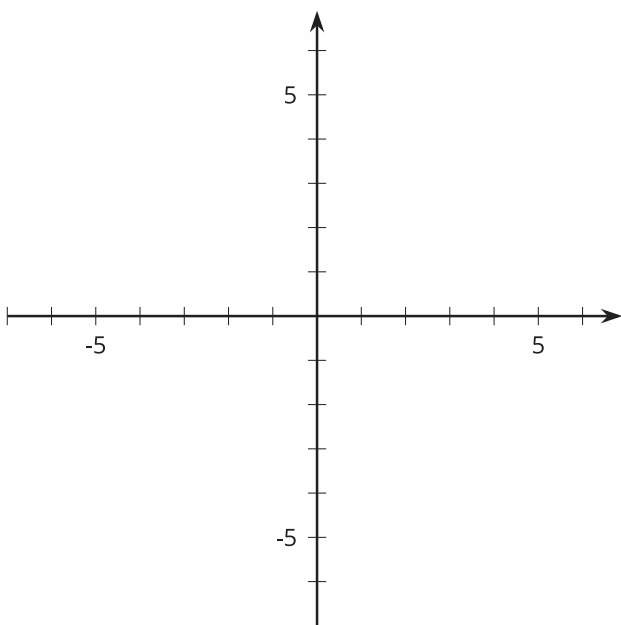
x	2	3	4	5	6	7	8
$t(x)$	-11	-2	1	-2	-11	-26	-47

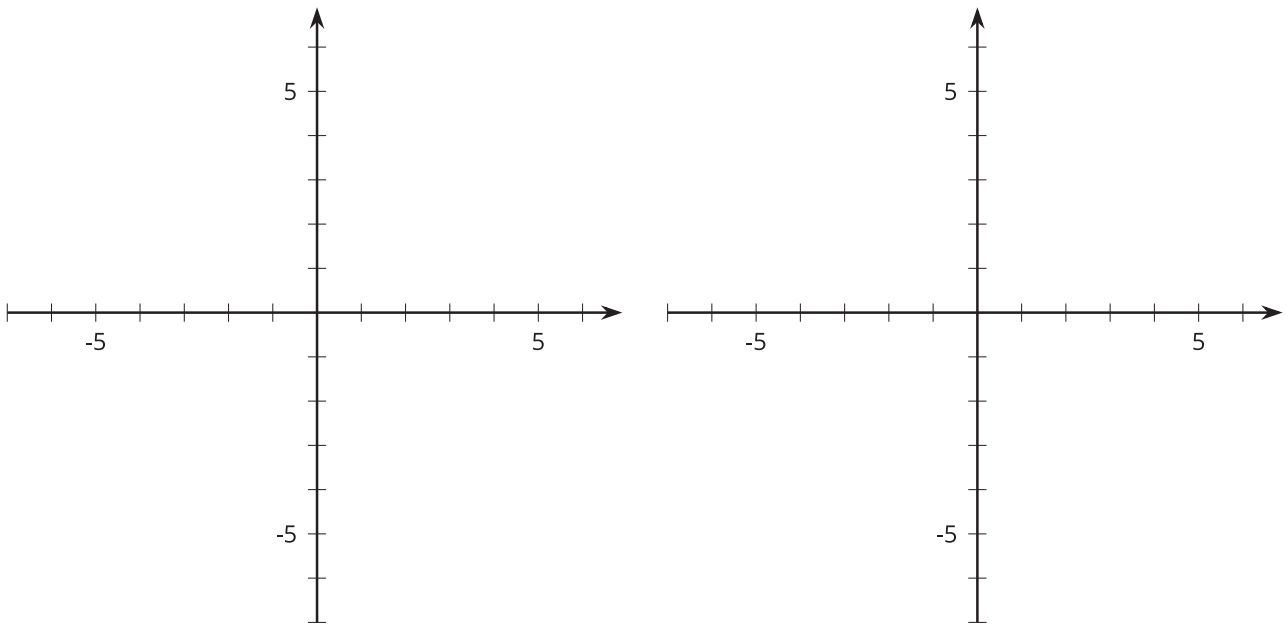
x	-2	-1	0	1	2	3	4
$u(x)$	13	4	1	4	13	28	49

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