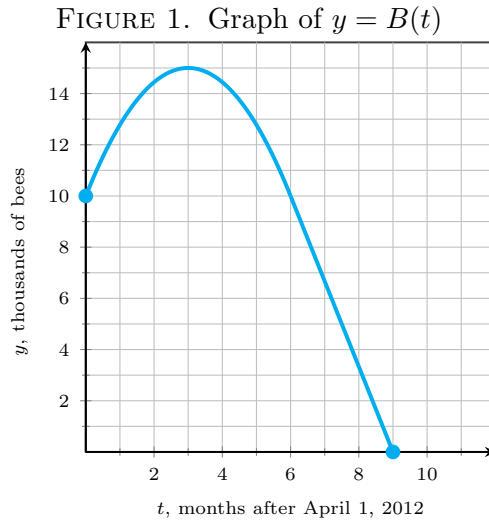


# Math 111 Lecture Notes

## SECTION 1.2: THE GRAPH OF A FUNCTION

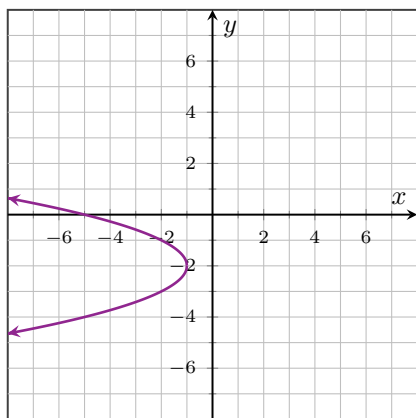
**Example 1.** Bees! A population of bees was happily residing in someone's backyard last year. Let  $B(t)$  the size of the bee population (in thousands)  $t$  months after April 1, 2012. This function is modeled in Figure 1.



- (a) Find  $B(3)$ . Explain what this function value represents in the context of the problem.
- (b) Find  $B(0)$ . Explain what this function value represents in the context of the problem.
- (c) Solve  $B(t) = 13$ . Explain what this solution set represents in the context of the problem.
- (d) Solve  $B(t) = 3$ . Explain what this solution set represents in the context of the problem.
- (e) State the domain and range of  $B$ .

**Example 2.** Determine if the graphs in Figures 2-5 are functions. State the domain and range for each graph.

FIGURE 2

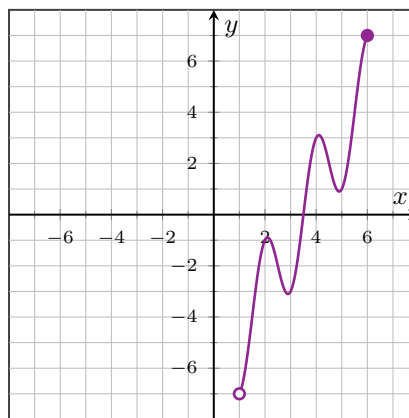


Function?

Domain:

Range:

FIGURE 3

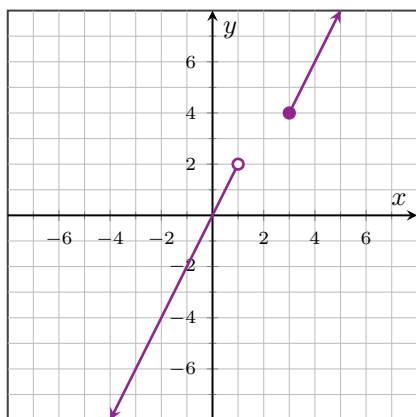


Function?

Domain:

Range:

FIGURE 4

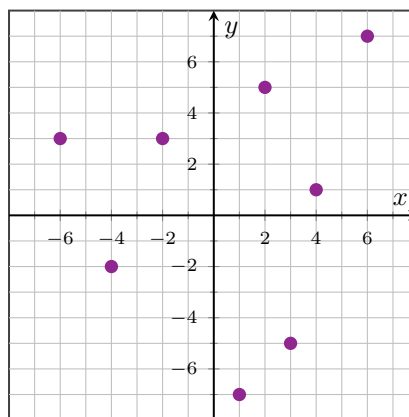


Function?

Domain:

Range:

FIGURE 5



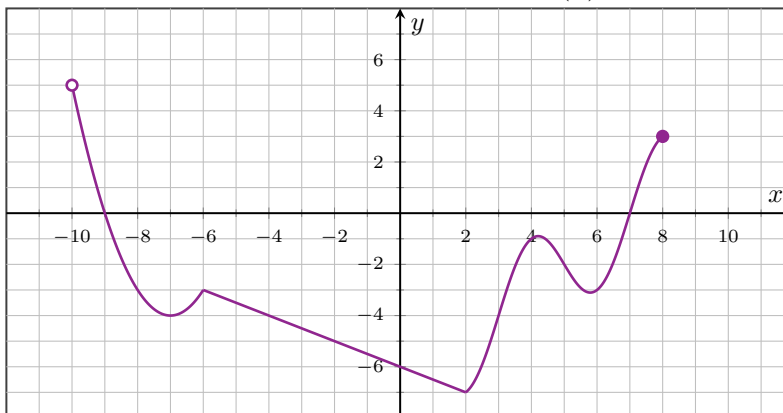
Function?

Domain:

Range:

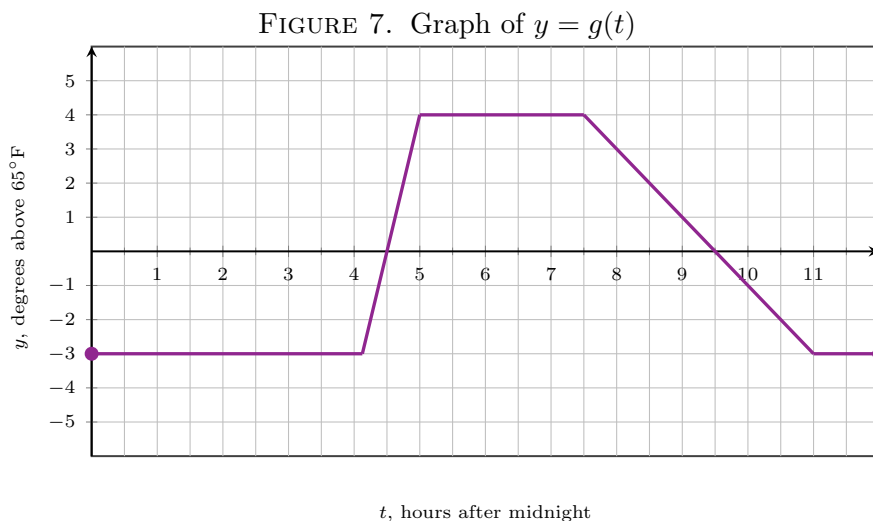
**Example 3.** Use the graph of  $y = f(x)$  in Figure 6 to answer the following.

FIGURE 6. Graph of  $y = f(x)$



- (a) Find  $f(0)$  and  $f(-2)$ .
- (b) Evaluate  $f$  at 4.
- (c) Is  $f(-3)$  positive or negative?
- (d) For what values of  $x$  is  $f(x) = 0$ ?
- (e) State the zeros of  $f$ .
- (f) What are the horizontal intercepts?
- (g) What is the vertical intercept?
- (h) Solve  $f(x) = -4$ . State the solution set.
- (i) For what values of  $x$  is  $f(x) < -4$ ?
- (j) For what values of  $x$  is  $f(x) > 0$ ?
- (k) State the domain of  $f$ .
- (l) State the range of  $f$ .

**Group Work 1.** Assume the base temperature setting for the thermostat in a house is 65°F. Let  $g(t)$  be the number of degrees above 65°F  $t$  hours after midnight. Answer the following use the graph of  $y = g(t)$  in Figure 7.



- (a) Find and interpret  $g(6)$ .
- (b) Solve and interpret  $g(t) = 2$ .
- (c) Is  $g(2)$  positive or negative?
- (d) What are the zeros of  $g$ ?
- (e) What are the horizontal intercepts?
- (f) What is the vertical intercept?
- (g) For what values of  $t$  is  $g(t) = 4$ ?
- (h) For what values of  $t$  is  $g(t) < 2$ ?
- (i) For what values of  $t$  is  $g(t) \geq 0$ ?
- (j) State the domain and range of  $g$ .