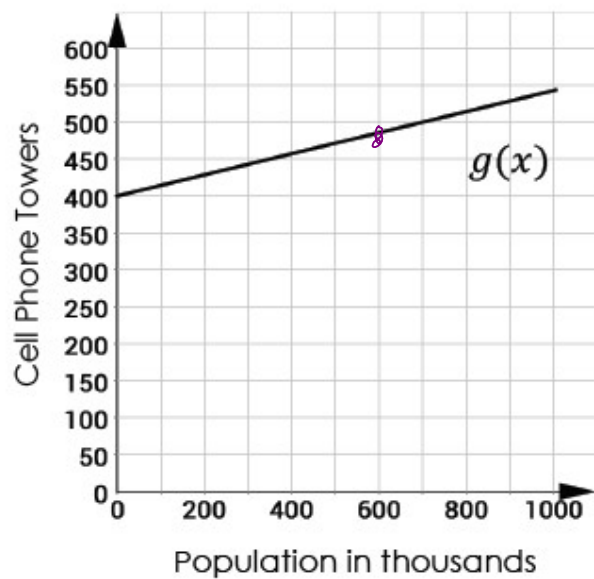
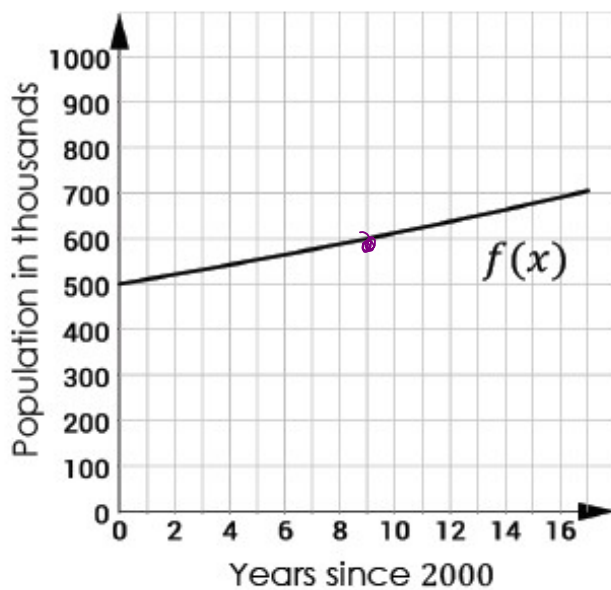


Consider the graph below of $f(x)$, which shows the population in thousands of a small town since 2000. The graph of $g(x)$ shows the number of cell phone towers based on the population in the same town since 2000.



What is the value of $f(9)$, and what does it represent in the context of this example? *600,000 people in 2009*

What is the value of $g(600)$, and what does it represent in the context of this example? *Approximately 480 cell towers*

What is the value of $g(f(9))$ and what does it represent in the context of this example?

In 2009, when the population is 600,000 people, there are approximately 480 cell towers.

In general, what can we say about $g(f(x))$ in the context of this situation?

As time passes since 2000, and as the population increases the number of cell towers also increases.

c. Find $f(g(-3))$.

$$g(-3) = -4(-3)$$

$$g(-3) = 12$$

$$f(12) = (12)^2 - 5(12) + 2$$
$$= 144 - 60 + 2$$

$$f(12) = 86$$

$$f(g(-3)) = 86$$

d. Find $(g \circ f)(-3)$.

$$f(-3) = (-3)^2 - 5(-3) + 2$$
$$= 9 + 15 + 2$$

$$f(-3) = 26$$

$$g(26) = -4(26)$$

$$g(26) = -104$$

$$(g \circ f)(-3) = -104$$

Try It!

2. Consider $f(x) = x - 3$ and $g(x) = x^2$.

a. Find $(f \circ g)(x)$.

$$(f \circ g)(x) = x^2 - 3$$

b. Find $(g \circ f)(x)$.

$$(g \circ f)(x) = (x - 3)^2$$

BEAT THE TEST!

1. Consider the following functions.

$$f(x) = 2x$$

$$g(x) = \sqrt{x}$$

$$h(x) = x^2 + 3$$

$$(2x)^2 + 3 \\ 4x^2$$

Match the functions below with their compositions.

$$\underline{D} \quad H(x) = \sqrt{x^2 + 3}$$

$$\underline{A} \quad G(x) = \sqrt{2x}$$

$$\underline{E} \quad F(x) = 4x^2 + 3$$

$$\underline{F} \quad H(x) = 2x^2 + 6$$

$$\underline{C} \quad G(x) = 2\sqrt{x}$$

$$\underline{B} \quad F(x) = x + 3$$

$$\cancel{A}. \quad (g \circ f)(x)$$

$$B. \quad (h \circ g)(x)$$

$$\cancel{C}. \quad (f \circ g)(x)$$

$$\cancel{D}. \quad (g \circ h)(x)$$

$$\cancel{E}. \quad (h \circ f)(x)$$

$$\cancel{F}. \quad (f \circ h)(x)$$

Assignment: Practice workbook and
"check your understanding for
Section 1: Topic 5

