

Graphical Representation of Functions

- 1) a) $f(0) = 3$
 $f(8) = -2$ b) $f(-5) < 0$ since $(-5, f(-5))$ sits below the x-axis on the graph of $f(x)$.

c) $f(x) = 0$ @ $x = -3, 6, 10$ d) $f(x) = 3$ @ $x = 0, 4$

e) $f(x)$ is increasing on $(-6, 2) \neq (8, 11)$ b/c the slope of $f(x)$ is positive

f) $f(x) = \frac{1}{2}$ three times g) $f(f(2)) = f(4) = 3$

h) $(-5, -2)$ $(11, 1)$

$$m = \frac{3}{16}$$

$$y + 2 = \frac{3}{16}(x + 5)$$

or

$$y - 1 = \frac{3}{16}(x - 11)$$

2) a) $f(0) = 1$
 $f(3) = 2$

b) $f(8) < 0$ since $(8, f(8))$ lies below the x-axis

c) $f(x) = 0$ @ $x = -1, 5, 9$ d) $f(x) = 2$ @ $x = 1, 3$

e) $f(x)$ is decreasing on $(-3, -2), (2, 7)$ b/c the slope of $f(x)$ is negative

f) $f(x) = \frac{1}{4}$ three times

g) $m = \frac{f(5) - f(2)}{5 - 2}$

$$= \frac{0 - 3}{3}$$

$$= -1$$

h) $m = 0$

$$3) a) (f \circ g)(3) = f(g(3)) \\ = f(-1) \\ = 4$$

$$b) g(f(2)) = g(1) \\ = -2$$

$$c) g(f(5)) = g(-5) \\ = \emptyset$$

$$d) f(g(-3)) = f(-2) \\ = 3$$

$$e) g(f(-1)) = g(4) \\ = 2$$

$$f) f(g(-1)) = f(4) \\ = -\frac{7}{2}$$

4) a) At $t = 10$ min, Holly was 0.75 miles from home.

b) At ~ 14 min, Holly was 1 mile from home.

c) Holly was more than $\frac{1}{2}$ mile from home on $(7, 84)$.

d) Holly was resting on $(60, 74)$

e) Holly reached the ocean at $t \approx 38$ min, 2.5 miles from home

$$f) m = \frac{1.5}{20} = 0.075 \frac{\text{miles}}{\text{min}}$$

$$g) m = 0 \frac{\text{miles}}{\text{min}}$$

h) $t = 90$ min Holly returned home.

i) Holly was jogging fastest @ $t = 29$ min since the graph of her distance is steepest.

