Worksheet 1 – Functional Notation (§3.2)

- 1. Let h(x) = -3, $f(x) = \sqrt{x-3}$, and k(x) be represented by the graph at the right. Compute the following.
 - (a) h(7)(c) f(7)(e) k(2)(b) h(123,456)(d) x, if f(x) = 5(f) x, if k(x) = 0
- 2. Let $f(x) = x^2 2$ and g(x) = 2x 3. Compute and simplify/expand the following expressions.

(a) $f(a)$	(c) $g(x-2)$
(b) $f(a+1)$	(d) $g(x+h) - g(x)$

3. Compute and simplify/reduce the expression $\frac{f(x+h)-f(x)}{h}$ for the following functions.

(a) $f(x) = 5 - 3x$	(c) $f(x) = -x^2 + 2x$	(e) $f(x) = \sqrt{x}$
(b) $f(x) = 6$	$(\mathbf{d}) f(x) = x^3$	$(\mathbf{f}) f(x) = \frac{1}{x}$

- 4. Determine the domain of the following functions.
 - (a) $f(x) = x^4 x^3 3x$ (e) $f(x) = \sqrt{3 x}$ (i) $f(x) = \frac{6}{\sqrt{6x 2}}$ (b) $f(x) = \frac{x - 2}{x + 1}$ (f) $f(x) = \frac{1}{\sqrt{3 - x}}$ (j) $f(x) = \frac{1}{5 - \sqrt{x}}$ (c) $f(x) = \frac{2x}{x^2 + 4}$ (g) $f(x) = \sqrt[3]{3 - x}$ (k) $f(x) = \frac{6}{4 - \sqrt{6x - 2}}$ (d) $f(x) = \frac{x + 4}{x^2 - 36}$ (h) $f(x) = \frac{3x}{x^2 + x - 2}$ (l) $f(x) = \sqrt{x - 7} + \sqrt{9 - x}$
- 5. The amount of unconverted substance remaining after a chemical reaction begins is modeled by the formula $U(t) = \frac{60}{1+5t}$, there U is in grams and t is in seconds. Compute U(0) and interpret its meaning. Then solve U(t) = 10 and interpret its meaning.
- 6. The height of an object dropped from the roof of an eight story building is modeled by: $h(t) = -16t^2 + 64$, $0 \le t \le 2$. Here, *h* is the height of the object off the ground, in feet, *t* seconds after the object is dropped. Compute h(0) and solve h(t) = 0. Interpret your answers to each.
- 7. The temperature *T* in degrees Fahrenheit of a Canadian city *t* hours after 6 AM is given by $T(t) = -\frac{1}{2}t^2 + 8t + 3$ for $0 \le t \le 12$. Compute and interpret T(0), T(6), and T(12).
- 8. The python population of a certain Florida county is modeled by: $P(t) = \frac{150t}{t+15}$, where t represents the numbers of years since the year 1800. Compute and interpret P(0) and P(205).

