1. Similar to problem 5.2 from HW 2.
   ANSWER: \( \frac{f(a + h) - f(a)}{h} = 5 - 2a - h \)

2. Similar to problem 8.9 from HW 4.
   (a) HINT: The only values that you can plug into \( f \) are those values between -4 and 10. So, the domain of \( g \) is the set of all \( x \) such that \(-4 \leq \frac{1}{2}(x + 1) \leq 10\). The range of \( g \) is the same as the range of \( f \).
   ANSWER: \( D_g = [-9, 19], R_g = [0, 9] \)
   (b) HINT: The domain of \( h \) is the same as the domain of \( f \). The range of \( h \) consists of the values you get from taking the numbers in the range of \( f \), multiplying by \( \frac{1}{2} \) and adding 1.
   ANSWER: \( D_h = [-4, 10], R_h = [1, 5.5] \)

3. Similar to problem 2.6, done in class, and 5.9 from HW 3.
   HINT: You have \( x \) feet of pipe at $12 per foot along the road. The length of pipe off the road is the hypotenuse of a right triangle whose legs have length \( 700 - x \) feet and 450 feet. Use the Pythagorean Theorem to find the length of the hypotenuse in feet. This length costs $17 per foot.
   ANSWER: \( C(x) = 12x + 17\sqrt{450^2 + (700 - x)^2} \)

4. Similar to problem 4.5, done in class.
   (a) HINT: You want the line that goes through the points (0, 75) and (8, 304).
   ANSWER: \( D(t) = 28.625t + 75 \)
   (b) HINT: You want the line that goes through the points (0, 210) and (8, 490).
   ANSWER: \( B(t) = 35t + 210 \)
   (c) HINT: Set \( D(t) = 250 \), solve for \( t \) and plug the resulting value into \( B(t) \).
   ANSWER: 424 books
   (d) HINT: Set \( B(t) = 2D(t) \) and solve for \( t \).
   ANSWER: \( t = 2.70 \) years OR during the year 1997

5. Contains elements of problem 3.7 from HW 2, 3.9 done in class, 4.7 from HW 2, and Chapter 1.
   (a) ANSWER: \( (x - 70)^2 + (y - 40)^2 = 50^2 \)
(b) HINT: Compute \((100 - 70)^2 + (10 - 40)^2\). What does it mean if this number is less than \(50^2\)?

ANSWER: The boulder does lie in the field.

(c) HINT: Set \(y = 0\) in the equation for the circle in part (a) and solve for \(x\). You should get two values \((x = 40\) and \(x = 100\)). Farmer Jones walks 40 yards at 4 miles per hour.

ANSWER: 20.45 seconds

6. Contains elements of problem 7.1 done in class, 7.2 from HW 3, 7.5 from HW 3, and 6.10 from HW 3.

(a) HINT: Find the \(y\)-coordinate of the point on the parabola when \(x = 30\). That is, plug \(x = 30\) into the formula for the parabola.

ANSWER: 172 feet

(b) HINT: You want the \(y\)-coordinate of the vertex. You should note that the parabola is already in vertex form.

ANSWER: 217 feet

(c) HINT: Find where the parabola crosses the \(x\)-axis by setting \(-\frac{45}{529}(x - 53)^2 + 217\) equal to 0 and solving for \(x\). This will give the \(x\)-intercept. You must subtract 30 to get the distance from the base of the cliff.

ANSWER: 73.51 feet

(d) ANSWER: \(h(x) = \begin{cases} 172 & \text{if } 0 \leq x \leq 30 \\ -\frac{45}{529}(x - 53)^2 + 217 & \text{if } 30 \leq x \leq 103.51 \end{cases}\)