Building Functions Worksheet 1

1. Write a symbolic function describing the distance traveled by sailboat as a function of headwind and forward speed.

2. Kinetic energy can be written as $KE = \frac{1}{2}mv^2$. Write KE in terms of time t.

3. Build a function that models the temperature of a cooling body given that the initial temperature is T_i and the rate of cooling is e^{-Tt}.

4. If your initial position is x_i and you are traveling at a constant speed v. What is your position in terms of time t?

5. If $f(x) = x^2 + 2x + 1$ and $g(f) = \frac{f+\sqrt{f}}{2f}$, then what is $g(f(x))$?

6. The likelihood of a Justin Bieber encounter is inversely proportional to how far away from his house you are. If the function is given as $B(d) = d^n$, where d is the distance away from his house, what limitations would you expect constant n to have?

7. Your lifelong dream is to meet Lady Gaga in person. After seeing her in concert, you're 100% certain this dream will come true, but for every year that you don't see her live in concert, your half as sure that it'll really happen. Come up with a function that describes the yearly decay of your lifelong dream.

8. The potential energy of an object is given by $PE = mgh$. If the object is thrown and its height h is a function of time such that $h(t) = -0.6t^2 + 3t$, what is the potential energy of the object in terms of time?

9. Using the function you came up with, at which point in time is PE the highest? What is this value in terms of m and g?

10. If the overall energy of the object is the sum of its kinetic and potential energy ($KE = \frac{1}{2}mv^2$), and the velocity v of the object is a function of time such that $v = \frac{h}{t}$, what is the overall energy of the object in terms of m, g, and t?
