Name:

Complete the following problems to the best of your ability. **SHOW ALL OF YOUR WORK.** Unshown work will not be graded. You may use a calculator.

1. Suppose a radioactive isotope's mass deteriorates over time, and that the decay is exponential. Suppose the mass of an object made of this isotope is 150g after three years, and then 127.5g after four years.

   (a) What is the yearly percent change in the mass of the object?

   (b) Find a function for $M(t)$, the mass of the object as a function of time t in years.

   (c) What was the mass of the object originally?

   (d) What is the mass of the object after 10 years?

2. Suppose Abigail deposits $1000 into an account that gives 5% interest annually, and Billy deposits $950 into an account that gives 5% interest compounded monthly.

   (a) Give functions for $A(t)$ and $B(t)$, the amount in Abigail's and Billy's accounts respectively.

   (b) How much do Abigail's and Billy's accounts contain after 10 years?

   (c) How much do the accounts contain after 50 years?

3. Are the following functions linear or exponential? Sketch a graph of the function.

   (a) $f(x) = 2x + 4$

   (b) $f(x) = 9 \cdot 1.6^x$

   (c) A function with initial value 4 and constant rate of change -2.

   (d) A function with initial value 1 increasing at a rate of 40% .

Optional Problems:
3.2: All
3.3: All
3.4: All