Math-3A Name_____ ID: 1

SM3-A HW #7-6 (money, radioactivity, cooling)

Date_____ Period____

1) Find the time required for an investment of $1000 to double if the money is placed in a simple interest account (compounded once per year) that earns 3.5% interest.

2) Find the time required for an investment of $1000 to double if the money is placed in an account that is compounded once per month that earns 3.5% interest.

3) You found an account of yours that has $20,500 in it. You remember putting $15,000 into the account 10 years ago. If the account was compounded quarterly, what annual interest rate did the bank pay?

4) If you put $1500 into an interest bearing account that pays 2.75% interest compounded monthly, how much money will be in the account at the end of the 12th year?

5) Polonium-210 decays to Lead-206.
   a) If the half life of Polonium-210 is 140 days, what is the base of the exponential function?
   b) If there was intially 20 grams of Polonium-210, how many grams would there be after 253 days?

6) The half life of Rubidium-88 is 18 minutes.
   a) What is the base of the exponential function?
   b) Initially there was 15 grams of Rubidium-88. How many grams would there be after 28 minutes?

7) The half-life of Iodine-131 (a radioactive isotope that is present after a nuclear explosion or a nuclear reactor melt-down) is about 8 days.
   a) What is the base of the exponential function?
   b) How long would it take for the amount of I-131 to decay to 1/8 of its original amount? (Hint: Assume that intially there was 80 grams. The final amount would be 10 grams. Find the time for 80 grams to decay away to 10 grams).

8) The half-life for Pllutonium 238 (a fissionable isotope of plutonium) is 87.7 years
   a) What is the base of the exponential function?
   b) How long would it take for the amount of Pu-238 to decay to 1/8 of its original amount?

9) $f(x) = \sqrt[3]{x+2} + 2$

10) $f(x) = 1 - x^3$

11) A pizza was cooked in an oven at 425 degrees Fahrenheit. The pizza was removed from the oven and placed on the counter in a room that was at 75 degrees. After 10 minutes the temperature of the cake was 200 degrees.

a) Find the equation that models this situation using: $T(t) = AB^t + k$

b) How long will it take to cool to 105 degrees?

12) A bowl of soup was taken from a pot that was at a temperature of 90 C. 15 minutes later the bowl of soup was at 50 C. The temperature of the room was 25 C.

a) Find the equation that models this situation using: $T(t) = AB^t + k$

b) How long does it take for it to cool to 35 C?

Perform the indicated operation.

13) $h(x) = 3x + 2$
$g(x) = -3x^2 - 4$
Find $(4h - g)(x)$

14) $f(x) = x^2 + 4x$
$g(x) = 3x + 5$
Find $(2f - 2g)(-10)$

15) $f(x) = 2x + 4$
$g(x) = x^3 - 5x$
Find $(f \circ g)(x)$

16) $g(n) = n - 3$
$f(n) = n^2 - 3$
Find $(g \circ f)(2)$