Name_____ ID: 1

SM3-A HW #8-5 (money, sound, pH, radioactivity)   Date_____ Period____

1) Suppose that you test apple juice and find that the hydrogen ion concentration is H+ = 0.0003 moles/li. Find the pH value and determine whether the juice is basic or acidic. (If pH > 7 it is basic).

2) You test some ammonia and determine the hydrogen ion concentration to be H+ = $1.3 \cdot 10^{-9}$ moles/li. Find the pH value and determine whether the ammonia is basic or acidic.

3) What is the H+ concentration if the measured pH = 2.7?

4) What is the H+ concentration if the measured pH = 12.4?

5) 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.

6) The front row of a rock concert has a sound intensity of 1.5×10^2 watts/m^2. How loud is the sound in decibels? (they need to turn the volume down or you will go deaf!)

7) What is the sound intensity of a sparrow in flight that makes 2 dB of sound?

8) Polonium-210 decays to Lead-206. If the half life of Polonium-210 is 140 days, what is the decay constant (the "k" value for the base 'e' exponential) (show your work).

9) The half life of Rubidium-88 is 18 minutes. What is the decay constant?

10) 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 decay constant (the base 'e' growth rate) for I-131?
    b) How long would it take for the amount of I-131 to decay to 1/8 of its original amount?

11) The radioactive decay constant for Plutonium 238 (a fissionable isotope of plutonium) is -0.0079 per year.
    a) what is the half life for Pu-238?
    b) How long would it take for the amount of Pu-238 to decay to 1/8 of its original amount?

12) $\sqrt{12 - 2x} = \sqrt{2x}$

13) Solve. Round to nearest 1/10,000

$3 \cdot 7^{-5n-1} = 61$

14) Solve:

$\log_{12}\left(m^2 - 20\right) = \log_{12}\left(-7m - 2\right)$

15) Solve (hint: condense the log)

$\log_3\left(x + 5\right) - \log_3 x = 1$

16) Solve (hint: condense the log)

$\log_4\left(x - 6\right) - \log_4 x = 1$

17) Solve (hint: condense the log)

$\log_3 4 + \log_3 x^2 = 4$

18) 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) Convert this equation to a base 'e' exponential equation of the form: $T(t) = Ae^{kt} + m$

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