Math-2 Name_____ ID: 1

SM2 HW #9-5 (money, cool-down)

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.

$A(t) = A_o\left(1 + \frac{r}{k}\right)^{kt}$

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) Polonium-210 decays to Lead-206.
   a) If the half life of Polonium-210 is 140 days, what is equation that models the decay of Polonium-210. Assume an intial amount of 100 grams. Write the base of your exponential to the nearest 1/1000.
   b) How much of the 100 grams will remain (to the nearest 1/10) after 365 days (1 year)?

4) The half life of Rubidium-88 is 18 minutes.
   a) What is equation that models the decay of Rb-88? Assume an intial amount of 100 grams. Write the base of your exponential to the nearest 1/1000.
   b) How much of the 100 grams will remain (to the nearest 1/10) after 60 minutes (1 day)?

5) 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 equation that models the decay of I-131? Assume 100 grams initially. Write your base to the nearest 1/1000.
   b) How much I-131 will remain after 30 days (1 month)?

6) 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? (solve by graphing)
   c) What will be the temperature after 15 minutes?

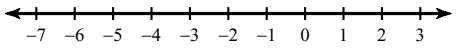
7) You found an account of yours that has $20,500 in it. You remember putting $15,000 into the account 10 years ago. If the account was compounded quarterly, what annual interest rate did the bank pay?

8) 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?

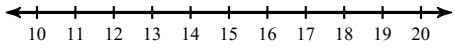
9) A bowl of soup was taken from a pot that was at a temperature of 90 C. 15 minutes later the bowl of soup was at 50 C. The temperature of the room was 25 C.
   a) Find the equation that models this situation using: $T(t) = AB^t + k$
   b) Convert this equation to a base 'e' exponential equation of the form: $T(t) = Ae^{kt} + m$
   c) How long does it take for it to cool to 35 C?

For all problems: write the solution to the inequality ("one step then rewrite") as (a) a simplified inequality, (b) interval notation, and (c) a number line graph.

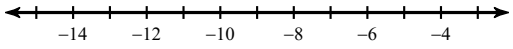
10) $p - 5 - 6p \geq 5$



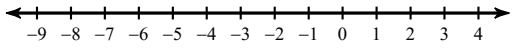
11) $3x + 3x > 6x + 2$



12) $x - 7 \leq -16$ or $x + 1 \geq -6$



13) $-8n \leq 48$ and $-6n > -12$



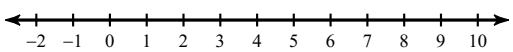
Solve each equation.

14) $|x - 9| + 5 = 7$

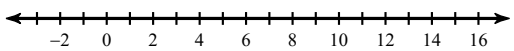
15) $9|9 + x| = 27$

Solve each inequality and graph its solution.

16) $|b - 5| > 1$



17) $|p - 6| \leq 7$



18) What does "the absolute value of 5" mean? Use distance in your explanation.