GSE Algebra 2 Name_____

Equivalent Interest Rates WS Date_____ Period_____

1. The value of a new car is $21,000 and its value depreciates by 16% each year. Write a function to represent the value of the car after *t* years, where the **monthly** rate of change can be found from a constant in the function. Round to 4 decimal places. Also, determine the **monthly** depreciation rate percentage.

2. The number of Americans developing heart disease is 92,000 and growing exponentially at a rate of 28% per year. Write a function to represent the number of Americans with heart disease after *t* years, where the **quarterly** rate of change can be found from a constant in the function. Also, determine the **quarterly** percentage rate of change.

3. The amount of yearly pollution generated from fossil fuels worldwide is 9.795 gigatonnes and grows exponentially by 5.6% each year. Write a function to represent yearly pollution after *t* years, where the **weekly** rate of change can be found from a constant in the function. Also, determine the percentage rate of change per **week**.

4. Element X is a radioactice isotope whose mass decreases by 55% every day. If an experiment starts with 725 grams of Element X, write a function to represent the mass of the sample after *t* days where the **hourly** rate of change can be found from a constant in the functions. Also, determine the percentage rate of change per **hour**.

Answers:

1) $f(t) = 21,000(.9856)^{12t}$
$1.44\%\, decrease\ per\ month$

2) $f(t) = 92,000(1.0637)^{4t}$
$6.37\%\, increase\ per\ quarter$

3) $f(t) = 9.795(1.0010)^{52t}$
$.10\%\, increase\ per\ week$

4) $f(t) = 725(.9673)^{24t}$
$3.27\%\, decrease\ per\ hour$

$$AER = \left(1 + \frac{r}{n}\right)^{n} - 1$$

5. When looking at your investment portfolio, you see that you have an investment instrument earing 10% interest compounding monthly. What is its annual equivalent rate (AER)?

6. An account collects quarterly interest at a rate of 7.125%. What annual interest does this account generate (find the AER)?

7. You have the option of putting your savings into one of two accounts? Account A offers 4% quarterly compounding interest. Account B offers 3.875% compounding monthly. Convert each of them into annual equivalent rates (AER) to decide which account is better.

8. Two savings account options are available at your local branch bank. Option 1 offers 5.5% semi-annual interest. Option 2 offers 5.45% quarterly interest. What is the difference in their annual equivalent rates (AER)?

5) 10.47% 6) 7.318% 7) 4.06% vs. 3.94% - Account A is .12% better 8) 5.57% vs 5.576% - Difference of .02%