PROBLEM SET – Exponential Functions/Geometric Sequences and Percents, Mr. Peralta, Class 821 and 829

Important Problems: **These problems show you that exponential functions (aka geometric sequences) can be multiplied by the same percent each time**

1) **Example** Term 0 is 60 and the common ratio is 80%. Find the next four terms. $A_0 = 60$ $A_1 = 60 * 0.8 = 48$ $A_2 = 48 * 0.8 = 38.4$ $A_3 = 38.4 * 0.8 = 30.72$ $A_4 = 30.72 * 0.8 = 24.576$	2) Term 0 is 60 and the common ratio is 75%. Identify the common ratio as a decimal. Find the next four terms. Common Ratio = $A_0 =$ $A_1 =$ $A_2 =$ $A_3 =$ $A_4 =$
3) Term 0 is 24 and the common ratio is 120%. Identify the common ratio as a decimal. Find the next four terms. Common Ratio = $A_0 =$ $A_1 =$ $A_2 =$ $A_3 =$ $A_4 =$	4) Term 0 is 80 and the common ratio is 5%. Identify the common ratio as a decimal. Find the value of A_3 Common Ratio = $A_3 =$

5) Term 0 is 12 and the sequence is ***growing*** by 60%. Write the common ratio as a decimal, then find the next four terms. (HINT: common ratio is not 0.6) Common Ratio = $A_0 =$ $A_1 =$ $A_2 =$ $A_3 =$ $A_4 =$	6) Term 0 is 120 and the sequence is ***decreasing*** by 5%. Write the common ratio as a decimal, then find the next four terms (HINT: common ratio is not 0.05) Common Ratio = $A_0 =$ $A_1 =$ $A_2 =$ $A_3 =$ $A_4 =$

The next problems are about identifying Term 0 and common ratios for percent problems

7. Adriana has an investment account whose value is given by the function $s(x) = 750(1.3)^x$ where x represents years.
    a. How much was Adriana's initial investment in the account?
    b. Identify the common ratio as a decimal and as a percent.
    c. By what percentage does the investment account grow every year?
    d. Find how much Adriana will have in the account after 6 years
    e. Suppose Adriana's account grew by 10% every year. Modify the function to reflect this.

8. A cup of coffee is cooling down such that the temperature (in Fahrenheit) is decreasing at a constant rate, given by the function $T(x) = 200(0.92)^x$ where x represents hours
    a. How hot was the coffee cup initially?
    b. Identify the common ratio as a decimal and as a percent.
    c. By what percentage is the coffee cup cooling down?
    d. How hot will the coffee cup be after 5 hours?

Extension Activity

1. Perform each of the following calculations using a single multiplication. Show the product that you use to find your final answer. Do not round your final answers.

   (a) Increase 350 by 5%

   (b) Increase 120 by 10%

   (c) Increase 34 by 2%

   (d) Increase \$450 by 3.5%

   (e) Increase \$1,300 by $6\frac{1}{2}\%$

   (f) Increase 2,698 by $2\frac{3}{4}\%$

2. Perform each of the following calculations using a single multiplication. Show the product that you use to find your final answer. Do not round your final answers.

   (a) Decrease 160 by 10%

   (b) Decrease 450 by 6%

   (c) Decrease 122,000 by 12%

   (d) Decrease \$1,820 by 3%

   (e) Decrease \$12,500 by 15%

   (f) Decrease \$4.50 by 8%

APPLICATIONS

3. A population of bacteria is growing at a rate of 20% per hour. If the population starts at 320, what is it an hour later?

   (1) 360

   (3) 372

   (2) 356

   (4) 384

4. The price of oil, in dollars per barrel, declined last week by 3.5%. If it started the week at \$102.00 per barrel, at what per barrel price did it end the week?

   (1) \$98.43

   (3) \$99.12

   (2) \$98.50

   (4) \$100.56