

**TRS 92: Exponential Functions and Doubling Time**

1. The world population in 2009 was estimated to be 6,776,917,465 (<http://www.census.gov>) with a 1.12% growth rate.
  - a. Round the population to the nearest million.
  - b. Write the number from **part a** in words.
  - c. Write an exponential function in function notation with the following variables:  
 Independent:  $t$  = time in years since 2009  
 Dependent:  $P$  = population in millions
  - d. Find  $P(5)$  using your function.
  - e. Interpret your answer from **part d** in context.
  - f. Use the Rule of 70 to estimate the doubling time of the population.

2. We often use rounding to make numbers easier to work with. It is always important to consider how much the rounding will change the results.

- a. In the table below, you will examine the change in results for a linear function if a slope of 2.27 is rounded to 2.3.

$x$	$y = 2.3x + 4$	$y = 2.27x + 4$	Difference
0			
5			
10			
15			

- b. In the table below, you will examine the change in results for an exponential function if a growth factor of 2.27 is rounded to 2.3.

$x$	$y = 4(2.3)^x$	$y = 4(2.27)^x$	Difference
0			
5			
10			
15			

- c. Does rounding have more effect on linear or exponential functions? Why do you think this is?

3. Complete the following tables for the functions given. Write all values using fractions (NO decimals!) You may need to review the rules for negative exponents from Day 7.

$y = 2^x$	
<b>x</b>	<b>y</b>
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	

$y = \left(\frac{1}{2}\right)^x$	
<b>x</b>	<b>y</b>
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	

**Textbook:** In Section 10.2 p. 838, complete #67-70, 72.

**Writing Prompt #5** –Your explanation should either be typed or written neatly on separate, lined paper or the back of this sheet. Vocabulary that should be used, but is not limited to, includes: rate, factor, and vertical intercept.

In 1991, the population of Canada was 27.3 million people and is growing at a rate of 5.7% each year. Let  $P$ , the population in millions, be the dependent variable. Let  $t$ , time in years since 1991, be the independent variable.

Write the exponential equation for the population growth over time. Explain all aspects of the creation of this equation.