



Name: _____ Date : _____

IM 3 UNIT 6 TEST V2 - Exponential and Logarithmic Functions
Teacher: Mr. Santowski and Mr. Smith

Score: _____

PART 1 - CALCULATOR INACTIVE QUESTIONS

1. Solve the following equations. Show key steps in your solutions if relevant (part marks may thus be awarded)

(15 marks)

(a) $4^x = \frac{1}{16}$

(b) $\log_8 32 = x$

(c) $27^{-\frac{2}{3}} = x$

(d) $\log_6(2x - 4) = 2$

(e) $x^3 = \frac{1}{27}$

(f) $\log_x\left(\frac{1}{32}\right) = -5$

(g) $81^{0.5} - \log_4(64) + \ln(1) = x$

2. You are given the following sequence of numbers: $\left\{72, -36, 18, -9, \frac{9}{2}, \dots\right\}$. The following questions deal with an analysis of this sequence of numbers.

(5 marks)

- a. Describe the pattern. (HINT: is there a mathematical relationship that exists amongst the terms?)
- b. List the next three terms of the sequence.
- c. DESCRIBE how you would determine the 16th term of this sequence. (BONUS: what IS the 16th term?)

3. Mr. Santowski and Mr. Smith each have started up separate textbook publishing companies. For Mr. Santowski's company, the monthly revenues since January 1, 2015 are modeled by the equation $R(t) = 12000 + 24000e^{-0.07t}$ and for Mr. Smith's company, the monthly revenues since January 1, 2015 are modeled by the equation $R(t) = 11000(1.0225)^t$.

(10 marks)

- a. At what rate are the revenues of both company changing?
- b. Which company has growing revenues? How do you know?
- c. Evaluate $R(0)$ for both companies.
- d. What does $R(20)$ represent?
- e. State a reasonable domain and range for this problem. Explain your reasoning.