Pre-Calculus 30
Unit 5 – Exponential and Logarithmic Functions

1. What do you think you will learn this unit?

2. What seems familiar about this unit?

3. What is your goal for this unit?

4. What steps will you take to meet this goal?

5. What is your comfort level, at this point, for this unit?

0   1   2   3   4   5

Pre-Calculus 30
Unit 5 – Exponential and Logarithmic Functions

1. What have you learned this unit?

2. Did you meet your goal?

3. If you met your goal, how did you meet it? If you did not meet your goal, what do you need to work on?

4. What did you enjoy about this unit?

5. What did you dislike about this unit?

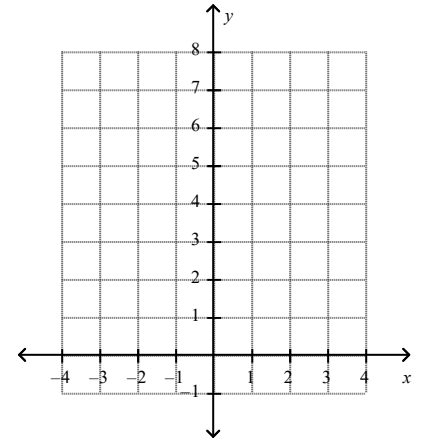6. What is your comfort level, at this point, for this unit?

0   1   2   3   4   5

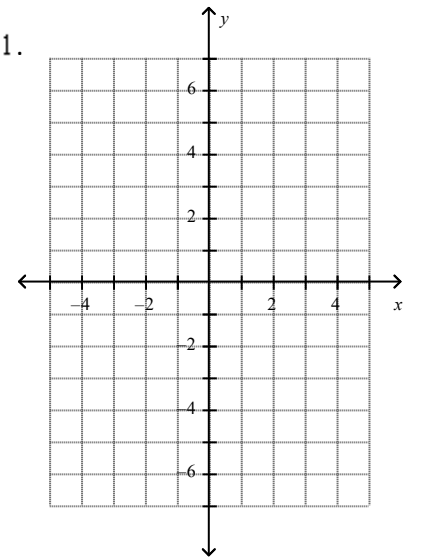# Unit Summary

Unit 5 – Portfolio Questions

5.1 – Graphing Exponential Functions

Graph the function $y = \left(\frac{1}{2}\right)^x$. Describe these characteristics of the graph: x-intercept, y-intercept, equation of the horizontal asymptote, domain, and range.

5.2 – Analyzing Exponential Functions

Use transformations to sketch the graph of the exponential function: $y = 2^{-3(x+2)} - 1$.

i)   increasing or decreasing
ii) the intercepts
iii) the equation of the asymptote
iv) the domain of the function
v)   the range of the function

5.3 – Solving Exponential Equations – Exponent Laws

a) Solve the following:

i) $\left(\sqrt[4]{5}\right)^{x-3} = \sqrt[3]{25}$

ii) $\left(\frac{1}{125}\right)^2 = 5^x$

b) To the nearest year, how long will it take an investment of $800 to double at an annual interest rate of 3%, compounded semi-monthly (twice a month)?

5.4 – Logarithms and the Logarithmic Function

a) Evaluate: $\log_8\left(\dfrac{1}{16}\right)$

b) Evaluate: $\log_2\left(128\sqrt{2}\right)$

c) To the nearest tenth, estimate the value of $\log_3 12.9$.

d) Write 3 as a logarithm with base 5.
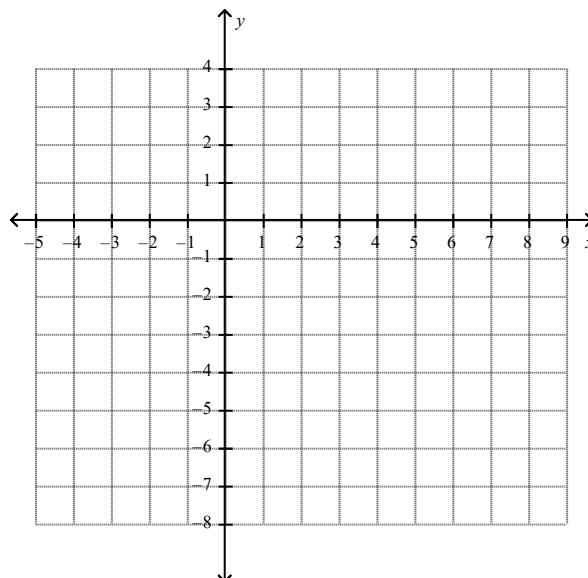
5.5 – The Laws of Logarithms

a) Write as a single logarithm: $\log(x^2 - 64) - \log(x+8)$

b) Write as a single logarithm: $\dfrac{4}{5}\log_9 x - 9\log_9 y - 5\log_9 z$

5.6 – Analyzing Logarithmic Functions

a) Graph $y = -3log_5\big(-4(x-5)\big) + 1$ on the grid below.

b) Identify the intercepts, the equations of any asymptotes, and the domain and range of the function.

5.7 – Solving Logarithmic and Exponential Equations

a) Solve: $92 = 4^{x-1}$

b) Solve: $\log(2x - 4) + \log(x - 3) = \log(x - 2) + \log(x + 5)$

5.8 – Solving Problems with Exponents and Logarithms

a) In 1949, Vancouver Island experienced an earthquake with a magnitude of 8.1.
In 2004, Vancouver Island experienced another earthquake, with a magnitude of 6.7.
How many times as intense as the 2004 earthquake was the 1949 earthquake?
Give the answer to the nearest whole number.

b) A principal of $300 is invested at 5% annual interest, compounded bi-weekly (every 2 weeks).
To the nearest year, when will the amount be $500?