

QUIZ 1: LOGARITHMS, LIMITS, And RATES OF CHANGE

1. Solve the following equations:

$$2^x = 64 \quad x = \underline{\hspace{2cm}}$$

$$3^y = \frac{1}{9} \quad y = \underline{\hspace{2cm}}$$

$$15^n = 1 \quad n = \underline{\hspace{2cm}}$$

$$\log_5 x = 3 \quad x = \underline{\hspace{2cm}}$$

$$\log_7 2401 = y \quad y = \underline{\hspace{2cm}}$$

2. Expand the following logarithmic expressions:

$$\log_3 \left(\frac{3x^2}{8y^3} \right)^5 = \underline{\hspace{10cm}}$$

$$\ln(9x^{-3}y^2)^5 = \underline{\hspace{10cm}}$$

3. Solve the following equation:

$$\ln\left(\frac{x}{2}\right)^{-2} = -4 \quad x = \underline{\hspace{3cm}}$$

4. A student wants to save \$15,000 for graduate school. If the student is starting out with \$7,500, how long will it take to make his goal, at 4.5% interest compounded continuously?

5. What is the limit of each equation?

$$\lim_{x \rightarrow 0} \frac{1}{x^4} \quad \text{Limit:}$$

$$\lim_{x \rightarrow \infty} \frac{3x^5 + 7x^2 - 5}{4x^5 - 12x^3 + 3x + 4} \quad \text{Limit:}$$

6. Let $f(x) = 3x^2$ What is the average rate of change of $f(x)$ between $x=2$ and $x=3$?

What is the instantaneous rate of change of $f(x)$ at $x=2$?

7. The cost of a monthly MUNI pass in 1980 was \$16.00. In 2010 it was \$60.00. What was the average rate of change in the cost of a MUNI pass?

8. The cost equation for the manufacturing of Canjura's Large Complex Widgets is given as follows:

$$C(x) = 5 + 3x - 10x^2 \quad (\text{Where } x \text{ is in units of widgets.})$$

What is the average rate of change between 10 units and 12 units?

What is the instantaneous rate of change at 10 units?