

Your signature _____

Show your steps, and work on another piece of paper. Unless otherwise indicated: Each question is scored: 2 points for the correct answer; 3 points for the correct work. Partial credit may be awarded.

- 1) Write a rational function that approximates attached. Make sure to show your explanation:
- 2) Write a transformed Log function for the graph on the following page.
- 3) Write a formula for the transformed exponential function graphed on the following page.
- 4) Write a formula to represent the sinusoidal on the following page

Solve the equation.

$$5) 4(7 - 3x) = \frac{1}{16}$$

Solve the equation. Give an exact solution.

$$6) \log_4(x - 4) + \log_4(x - 4) = 1$$

- 7) Find the domain of radical function below. Write using interval notation.

$$m(x) = \sqrt{(x-1)^2 (x+3)}$$

Prove that the equation is an identity.

$$8) \frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \csc \theta$$

9)

A cup of coffee is poured at 190° Fahrenheit, and is allowed to cool in a 70° room. If the temperature of the coffee is 170° after half an hour:

- a. Write an exponential function that gives the temperature of the coffee as a function of elapsed time.
- b. What will the temperature be after 70 minutes?
- c. How long will it take the coffee to cool to 120°??

Solve the problem.

- 10) A vertical antenna is mounted atop a 23-ft pole. From a point on the level ground 57 feet from the base of the pole, the antenna subtends an angle of 10.1°. Find the length of the antenna to the nearest tenth of a foot.



