

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. Make sure to show your explanation:
- 3) Write a formula for the transformed exponential function graphed on the following page. Make sure to show your explanation:
- 4) Write a formula to represent the polynomial on the following page. Make sure to show your explanation:
- 5) Write a formula to represent the trigonometric function on the following page. Make sure to show your explanation:
- 6) Find the domain of function below. Write using interval notation.

$$f(x) = \frac{\sqrt{2x^3 - 3x^2 - 23x + 12}}{x^3 + 125}$$

- 7) The count of bacteria in a culture was 600 after 20 minutes and 2000 after 35 minutes.
 - a. What was the initial size of the culture?
 - b. Find the doubling time.
 - c. Find the population after 170 minutes.
 - d. When will the population reach 12000?

Solve the problem.

- 8) Yosemite Falls in California consists of three sections: Upper Yosemite Fall (by itself one of the ten highest waterfalls in the world), the Middle Cascade, and Lower Yosemite Fall. From a footbridge across the creek 2500 feet from the falls, the angles of elevation to the top and bottom of Upper Yosemite Fall are $45^\circ 44'$ and $24^\circ 25'$, respectively. How high is the total series of three falls? How high is Upper Yosemite Fall? Round your answers to the nearest foot.

- 9) Solve. Round answers to one decimal place. A graphical solution earns 0 points

$$\log_3(2x + 1) + \log_3(x - 1) = 2$$

Solve the problem.

- 10) Find $\sin(\alpha)$, given that $\cos(\alpha) = \frac{2}{5}$ and α in quadrant IV.