

Name \_\_\_\_\_

**You have 12 minutes for this quiz.**

1. (4 points) Approximate  $\sqrt[3]{1018}$  using Newton's Method. You should determine a reasonable first approximation but use Newton's Method to determine a second approximation. Simplify this second approximation.

2. (3 points) Students are asked to use a linear approximation (or differential) to estimate the value of  $\sqrt[5]{e}$  without the use of a calculator. One student uses the function  $x^{1/5}$  and another student uses the function  $e^x$ . Choose which function is more appropriate for this problem, find its linear approximation (or differential), and use this to estimate  $\sqrt[5]{e}$ .

3. (3 points) The measured radius of a circle has a very small relative error. Which of the following is the approximate corresponding relative error in the area of the circle? You must show sufficient work to justify your answer.

- (a) Three times the relative error in the radius.
- (b) The square of the relative error in the radius.
- (c)  $\pi$  times the relative error in the radius.
- (d) Two times the relative error in the radius.
- (e) The square root of the relative error in the radius.