

Name:

### QUIZ 3

You must show all of your work for full credit.

**Problem 1.** Suppose  $f(x) = (x + 1)^4(x^3 + 4)$ . Calculate  $f'(0)$ .

**Problem 2.** Suppose  $f(x) = \frac{(3x^2 + 1)(2x - 1)}{5x + 4}$ . Calculate  $f'(0)$ .

**Problem 3.** A company's cost and revenue in dollars are given by

$$C(x) = 2x \text{ and } R(x) = 6x - \frac{x^2}{1000},$$

respectively, where  $x$  is the number of items produced. Find the value of  $x$  where the marginal *profit* is 0.

**Problem 4.** The demand function for an item is given by

$$q = 30 \left( 5 - \frac{p}{\sqrt{p^2 + 1}} \right),$$

where  $p$  is the price in dollars and  $q$  is the quantity demanded. Find the rate of change in the demand for the product per unit change in price when  $p = 3$ .