

Name:

## QUIZ 2

You must show all of your work for full credit.

**Problem 1.** Does

$$\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$$

exist? If so, find its value. If it doesn't exist, does it equal  $\pm\infty$ ? Explain your answer.

**Problem 2.** Does

$$\lim_{x \rightarrow -\infty} \frac{2x^4 - 1}{3x^2 + 2},$$

exist? If so, find its value. If it doesn't exist, does it equal  $\pm\infty$ ? Explain your answer.

**Problem 3.** Is there a value of  $k$  such that the following limit exists?

$$\lim_{x \rightarrow 3} \frac{2x^2 + kx - 3}{x^2 - 4x + 3}$$

If so, find the value of  $k$  and compute the corresponding limit. Otherwise, explain why not.

**Problem 4.** The profit (in hundreds of dollars) from production of  $x$  units of an item is

$$P(x) = x^2 - 5x + 6.$$

Using the limit definition of instantaneous rate of change, find the instantaneous rate of change of profit with respect to the number of items produced when  $x = 2$ . Then write a sentence explaining how to interpret this quantity.