

Name: _____

Take-Home Quiz

1. Is the following function continuous at $x = 2$? Justify your conclusion by checking the definition of continuity.

$$f(x) = \begin{cases} 2x^2 - 3 & \text{if } x < 2 \\ 2x + 1 & \text{if } x \geq 2 \end{cases}$$

2. For which value of k is the following function continuous at $x = 1$? (*This is a typical final exam question*)

$$f(x) = \begin{cases} \frac{x^2 - 3x + 2}{x - 1} & \text{if } x \neq 1 \\ k & \text{if } x = 1 \end{cases}$$

3. Use the definition of the derivative to find $f'(x)$ for the given function. Note that you must use the definition. (*This is a typical final exam question*)

$$f(x) = x^2 - 3$$

4. Use any method to find the derivatives of the following functions:

a) $f(x) = x^4$

b) $g(x) = 3x^2 - 5x$

c) $h(x) = 7x^3 - \frac{6}{x^2} + \frac{3}{4} \sqrt[3]{x^4} + \pi^2$