10350 Tutorial Week 03 - Set 01 Name _____

Section _____

1. Consider the piecewise defined function:

$$f(x) = \begin{cases} x - 1 & \text{if } x < 0 \\ x^2 + 1 & \text{if } x \geq 0 \end{cases}$$

Find the following limits:

1a. $\lim\limits_{x \to 0^-} \dfrac{f(x) - 5}{x - 2} \stackrel{?}{=}$

1b. $\lim\limits_{x \to 2} \dfrac{f(x) - 5}{x - 2} \stackrel{?}{=}$

1c. Is $f(x)$ continuous at $x = 0$? Use limit to explain your conclusion.

1d. Circle the following properties that apply to $f(x)$ at $x = 0$.

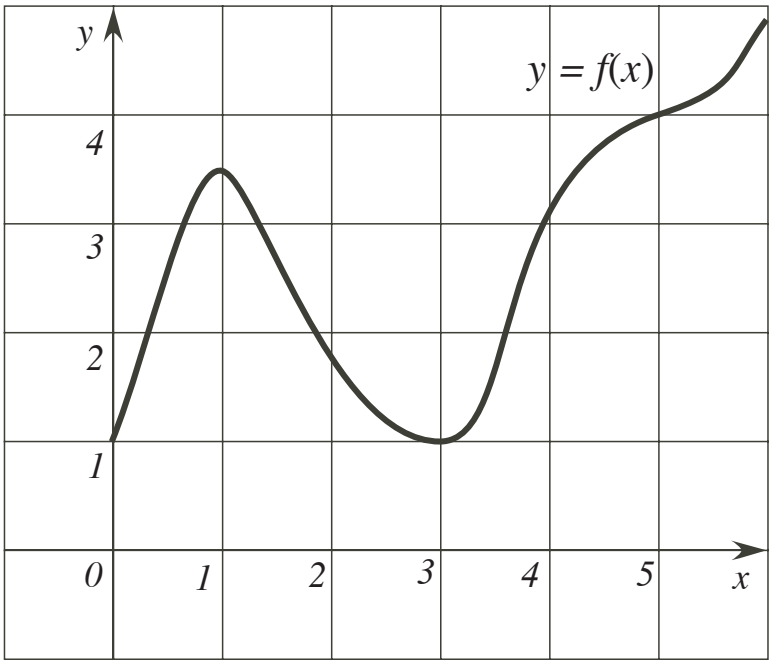
Continuous Jump Discontinuity Removable Discontinuity

Left Continuous Right Continuous

10350 Tutorial Week 03 - Set 02 Name _____

Section _____

2.



2a. Find the **average** rate of change of the function $f(x)$ over the interval $[3, 5]$.

2b. Find the **instantaneous** rate of change of the function $f(x)$ at $x = 3$.

2c. Is the **instantaneous** rate of change of the function $f(x)$ at $x = 4$ positive or negative?

2d. Order the **instantaneous** rates of change of the function $f(x)$ at $x = 1, 2, 4$ and 5 from smallest to largest in value.

(Smallest rate) $x =$ _____; $x =$ _____; $x =$ _____; $x =$ _____ (Greatest rate)

3. Consider an account with principle is \$2000 paying interest at an annual rate of 4% compounded **quarterly**.

3a. Find the balance of the account after 8 years. Simplify as far as possible and leave your answer in the form $k \cdot a^b$.

3b. How long will it take the balance of the account to increase 8 fold?