Quiz

Directions: Carefully read each question below and answer to the best of your ability in the space provided. You MUST show your work to receive full credit!

1. Consider the function

$$f(x) = x^2 - 4x - 7.$$

(a) (5 points) Find the instantaneous rate of change of $f(x)$ when $x = 2$.

Solution: The instantaneous rate of change is given by the derivative,

$$f'(x) = 2x - 4.$$

We find the slope of the tangent line by evaluating $f'(x)$ at $x = 2$ to get

$$f'(2) = 2(2) - 4 = 0.$$

(b) (5 points) Find a positive number A which is not equal to 1, so that the rate of change of $f(x)$ from $x = 1$ to $x = A$ is equal to 3.

Solution: We need to find $A \neq 1$ satisfies the following expression.

$$\frac{f(A) - f(1)}{A - 1} = 3.$$

First, let us evaluate

$$f(1) = 1^2 - 4 \cdot 1 - 7 = -10$$

and

$$f(A) = A^2 - 4A - 7.$$

We solve this equation for A as follows.

$$\frac{A^2 - 4A - 7 - (-10)}{A - 1} = 3; \quad A \neq 1$$

$$\frac{A^2 - 4A + 3}{A - 1} = 3; \quad A \neq 1$$

$$\frac{(A - 3)(A - 1)}{A - 1} = 3; \quad A \neq 1$$

$$A - 3 = 3 \implies A = 6$$

Name: _____

Section (circle one): 021 022 023 024

Question:	1	Total
Points:	10	10
Score:		