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. (5 points) Consider the function

$$f(x) = x^2 - 4x + 3.$$

Find the value of x for which the tangent line to $y = f(x)$ has slope equal to 4.

Solution: We need to find x where the derivative of $f(x)$ is equal to 4. Thus, we need to find the derivative of $f(x)$ first, which is equal to $f'(x) = 2x - 4$. And now setting $f'(x)$ equal to 4, we obtain:

$$2x - 4 = 4$$
$$2x = 8$$
$$x = 4.$$

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2. (5 points) Find the following limit:

$$\lim_{x \to 3} \frac{x^2 - 6x + 9}{x^2 - 9}.$$

Solution: If we just plug in $x = 3$, we got a zero on the bottom, therefore, we have to work a little harder and do some factoring and cancellations. We can factor the top as $x^2 - 6x + 9 = (x-3)(x-3)$ and the bottom as $x^2 - 9 = (x-3)(x+3)$. So using substitution and cancellation, we obtain

$$\lim_{x \to 3} \frac{x^2 - 6x + 9}{x^2 - 9} = \lim_{x \to 3} \frac{(x-3)(x-3)}{(x-3)(x+3)}$$
$$= \lim_{x \to 3} \frac{(x-3)}{(x+3)}$$
$$= \frac{0}{6} = 0.$$

Name: _____

Section (circle one): 021 022 023 024

Question:	1	2	Total
Points:	5	5	10
Score:			