Name Solution Key

UNIVERSITY OF WYOMING | Math 2200—Spring 2020 | Department of Mathematics

Calculus I

Quiz 7—Friday, April 10

Consider the function $f(x) = x^3 - 4x^2 + 5x$ for $0 \le x \le 2$. Since f is continuous and differentiable, the Mean Value Theorem asserts that there exists a point c with $0 < c < 2$ such that $f'(c)$ equals the average rate of change of f on [0,2].

a) Determine $f'(x)$.

$f'(x) = 3x^2 - 8x + 5.$

b) Determine the average rate of change of f on the interval [0,2].

$$\frac{f(2) - f(0)}{2-0} = \frac{2-0}{2-0} = 1.$$

c) Find all points c satisfying $0 < c < 2$ and $f'(c) = \frac{f(2)-f(0)}{2-0}$.

We must solve $3c^2 - 8c + 5 = 1$,

i.e. $0 = 3c^2 - 8c + 4 = (3c-2)(c-2)$.

For $0 < c < 2$, the only solution is $c = \frac{2}{3}$.