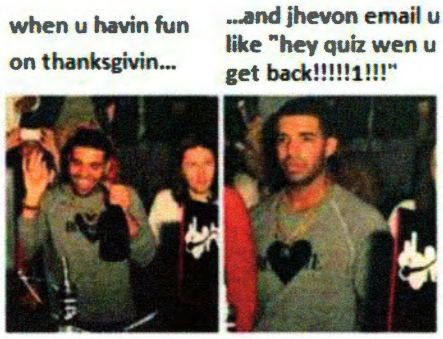
Math 201 Mock Quiz 10

December 2, 2019

Name: ANSWERS

Instructions: No calculators. Use provided scrap. Write your fully simplified answers in the space provided.



1. Find the critical numbers of $f(x) = x(2-x)^3$. If there are several answers, separate them with commas. If there are no critical points, write "None."

   $x =$ $\frac{1}{2}$, 2

2. Find the absolute extrema of $f(x) = x(2-x)^3$ on the interval $[1,3]$.

   Absolute max is: $f(1) = 1$

   Absolute min is: $f(3) = -3$

3. How do you know all the absolute extrema will be present in problem 2? f is continuous on $[1,3]$ (so the Extreme Value Theorem applies!)

4. Does the Mean Value Theorem apply to $f(x) = x^3 - x^2$ on $[0,1]$? If so, find the c value(s) that satisfy the conclusion of the Mean Value Theorem. In part (a), state "yes" or "no" and explain. If your answer is "yes", find the c value(s) and state them in part (b). If your answer is "no", put "N/A" for part (b).

   (a) Does MVT apply (justify)? Yes! f is continuous on $[0,1]$ and differentiable on $(0,1)$

   (b) $c =$ $2/3$

Bonus (Complete the other problems to be eligible):

1. On what interval is the function in problem 1 concave down? $(-\infty, 1) \cup (2, \infty)$

2. State the inflection point(s) of the function in problem 1 (or write "none", if so). Separate the points by commas if there are several $(1,1)$, $(2,0)$