Quiz 7: §3.1, 3.2 & 3.3
July 6, 2016

Instructions: Please show all of your work as partial credit will be given where appropriate, *and* there may be no credit given for problems where there is no work shown. All answers should be $\boxed{\text{boxed}}$ and completely simplified, unless otherwise stated. No electronics are allowed.

1. [**12 points**] Identify all the critical points and then identify the maximum and minimum points. *(Make sure the points are given as ordered pairs, not just one coordinate)*

$f(x) = \dfrac{12(x-3)}{x^2}$ on the interval $[3, 7]$

Are we guaranteed to find a max and min point?
 	
Yes   or   No
 	
Why or why not?
	Left end point:
	Do we get to consider this in choosing min/max points?
	                                        Yes or No
	Right end point:
	Do we get to consider this in choosing min/max points?
	                                        Yes or No

Stationary points:	**Singular points:**
Maximum Point: *(if it exists; if it doesn't, indicate this clearly)*	**Minimum Point:** *(if it exists; if it doesn't, indicate this clearly)*

2. [**8 points**] Answer these short questions.

Evaluate $\sin(4\pi/3)$	Circle each correct statement: (a) If $f'(c)$ is well defined, then $f(x)$ is continuous at $x = c$. (b) If there is a stationary point at $x = a$, then $f'(a) = 0$. (c) If $x = a$ makes the numerator and denominator equal to 0 in the original function, then there is a hole at $x = a$. (d) If there is a hole in the graph of the function $y = f(x)$ at $x = a$, then the function is discontinuous at $x = a$.
The derivative operator distributes through multiplication. That is, the derivative of a product of functions is the product of the derivatives of those functions. True or False	What are the three types of critical points? Don't just give their names. _____ _____ _____

3. For $f(x) = \dfrac{x^2}{x-1}$ on $[-3, 3]$, answer the following questions:

(a) [**2 points**] Find the vertical asymptotes (if any) of f.

Vertical Asymptote(s):_____

(b) [**6 points**] Fill in the sign line for $f'(x)$ given that $f'(x) = \dfrac{x(x-2)}{(x-1)^2}$

$\longleftarrow\!\!\!\!\!\rule{10cm}{0.4pt}\!\!\!\!\!\longrightarrow$

(c) [**4 points**] Find all critical points of f.

Critical points:_____

(d) [**2 points**] Find all local min and max point(s). If none exist, indicate this clearly. Be sure to give each answer as a pair $(x, f(x))$

Min point(s):_____   Max point(s):_____

(e) [**2 points**] Fill in the sign line for $f''(x)$ given that $f''(x) = \dfrac{2}{(x-1)^3}$

$\longleftarrow\!\!\!\!\!\rule{10cm}{0.4pt}\!\!\!\!\!\longrightarrow$

(f) [**2 points**] Find all inflection points of f *(if any exist).*

Inflection points:_____

(g) [**2 points**] Does f have a maximum on the specified interval? Minimum? Why or why not?