

Analytic Geometry and Calculus I

Quiz 4.2
Due Today

Name _____

Show all work necessary for your answer.

1. Compute the following limits.

(a) One is determinate. Declare an answer. One is not; write that one in an L'Hôpital form and compute.

$$\lim_{x \rightarrow \infty} x^2 \ln(x) = \qquad \lim_{x \rightarrow 0^+} x^2 \ln(x) =$$

(b) $\lim_{x \rightarrow 0} (\sin(x))^x$. [Hint: If a $\frac{\cos(x)}{\sin(x)}$ appears at some point, rewrite it as $\cot(x)$ and then as $\frac{1}{\tan(x)}$.]

2. Show that $f(x) = x^3 - 3x + 2$ on $[-2, 2]$ satisfies the hypotheses of the Mean Value Theorem. Find at least one value of c which satisfies its conclusion.

3. Try to draw the graph of a function which is continuous on $[0, 3]$ and which does not reach its absolute maximum on $[0, 3]$. Now draw the graph of a function which does not reach its absolute maximum on $[0, 3]$.

(over)

4. For the function $f(x) = x^3 - 6x^2 + 5$

(a) Find all the critical numbers of this function.

(b) Find all absolute extrema of this function on the interval $[-3, 5]$

(c) Find the intervals on which f is increasing and the intervals on which f is decreasing.