

RECITATION QUESTIONS

MATH 119

(WEEK 4)

1. Find the critical points of the function

$$f(x) = |x^2 - 1|$$

2. Find the critical numbers of the function

a) $g(x) = |2x + 3|$

b) $f(\theta) = 2 \cos \theta + \sin^2 \theta$

3. Find the absolute maximum and absolute minimum values of f on the given interval.

$$f(x) = \sin x + \cos x, \quad [0, \pi/3]$$

4. Show that the equation $2x - 1 - \sin x = 0$ has exactly one real root

5. At what values of x does f have a local maximum or minimum

(look at page 247 question 6 in Stewart for the graph of the function)

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

a) Find the intervals on which f is increasing or decreasing.

b) Find the local maximum and minimum values of f .

c) Find the intervals of concavity and the inflection points.

7. Evaluate the limit and justify each step by indicating the appropriate properties of limits.

a) $\lim_{x \rightarrow -\infty} \frac{\sqrt{9x^6 - x}}{x^3 + 1}$

b) $\lim_{x \rightarrow -\infty} (x + \sqrt{x^2 + 2x})$

c) $\lim_{x \rightarrow \infty} x \sin \frac{1}{x}$

8. Find the horizontal asymptotes of the curve and use them, together with concavity and intervals of increase and decrease, to sketch the curve

$$y = \frac{x}{x^2 + 1}$$