

MATH 113 - QUIZ 9 - 2 APRIL 2007

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

In each of the following problems, $f(x) = x^4 + 2x^3 + 2$.

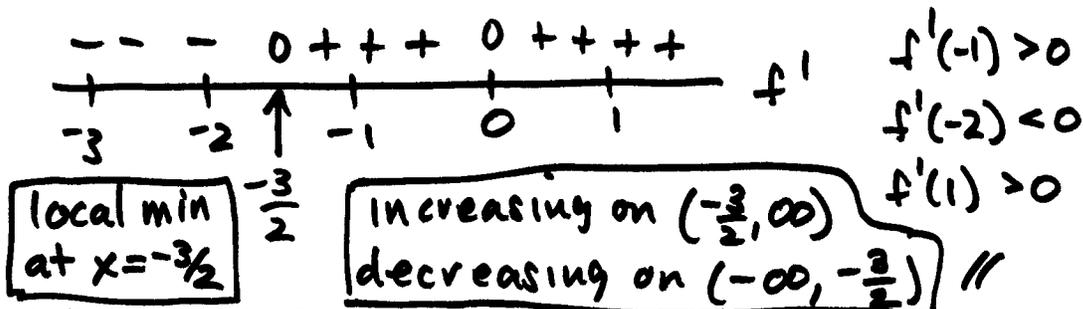
1. (4 pts.) Find all critical points for $f(x)$.

$$f'(x) = 4x^3 + 6x^2 \quad x = 0 //$$

$$4x^3 + 6x^2 = 0 \quad x = -\frac{3}{2} //$$

$$2x^2(2x + 3) = 0$$

2. (3 pts.) Find the intervals on which $f(x)$ is increasing and decreasing. Identify each critical point you found in Problem 1 as a local maximum, local minimum, or neither.



3. (3 pts.) Find the absolute maximum and minimum of $f(x)$ on the interval $[-2, 1]$.

$$f(-2) = 16 - 16 + 2 = 2$$

$$f\left(-\frac{3}{2}\right) = \left(-\frac{3}{2}\right)^4 + 2\left(-\frac{3}{2}\right)^3 + 2 = \frac{81}{16} - \frac{54}{8} + 2 = \frac{5}{16}$$

$$f(0) = 2$$

$$f(1) = 5$$

Absolute max at $x = 1$
of 5 //

Absolute min at $x = -\frac{3}{2}$
of $\frac{5}{16} //$