

HONOR 2201, CALCULUS FOR NON-SCIENCE MAJORS, FALL 2005

INSTRUCTOR: BO-HAE IM

Problems on Ch.4

1–3. Do the following for each of functions:

- (1) Find f' and f'' .
- (2) Find the critical points of f .
- (3) Find any inflection points of f .
- (4) Find local max/min of f .
- (5) Find the global max/min of f .
- (6) Graph f .

1. $f(x) = x^3 - 3x^2$, where $-1 \leq x \leq 3$

2. $f(x) = x + \sin x$, where $0 \leq x \leq 2\pi$

3. $f(x) = x^3 - 3x^2 - 9x + 15$, where $-5 \leq x \leq 4$

4. If $f'(x) = x^3 - 6x^2 + 8x$ for $0 \leq x \leq 5$, then describe how the function $f(x)$ changes over the given interval. Graph $f'(x)$. When is $f(x)$ increasing/ decreasing, where does $f(x)$ have a local max, min? Does it have an inflection point?

5. For what values of a and b does $f(x) = a(x - b \ln x)$ have a local minimum at the point $(2, 5)$? (Note that $0 < \ln 2 < 1$).

6. If the average cost $a(q) = b + mq$ for some constants b and m , then, find the marginal cost function $C'(q)$ in terms of b, m and q .

Date: October 3, 2005.