

Day 23 is Thursday, March 14, 2013

Continuing Section 5-2 2nd Derivatives + Concavity

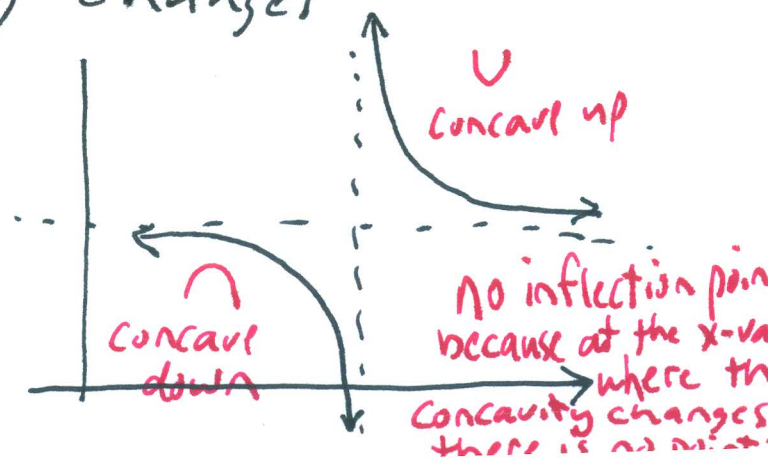
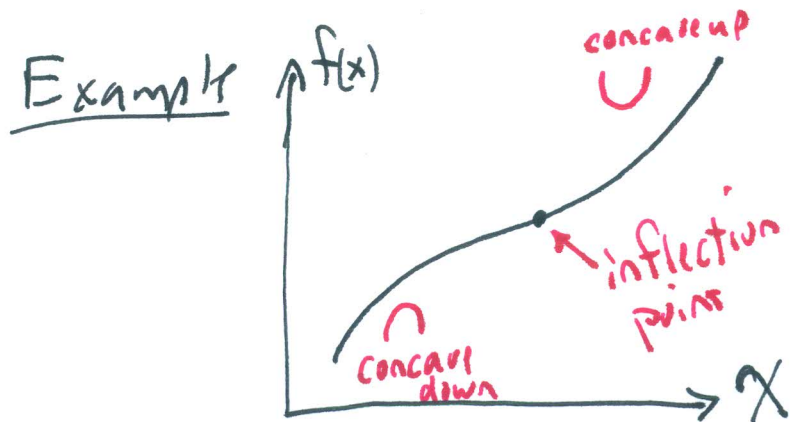
Relationship between 2nd Derivative + Concavity
See Reference 6 on page 7 of course packet.

Today: Examples using Reference 6 Table to answer questions about behavior of the graph of a function.

One more definition: Inflection Point

An inflection point is

- a point on a graph
- where the concavity changes



Examples For the functions f, g, h , do the following

- (A) Find intervals where function is increasing or decreasing
- (B) Identify x -coordinates of local max + mins.
- (C) Find y -coordinates of local max + mins.
- (d) Find intervals where function is concave up or down.
- (e) Find x -coordinates of inflection points
- (f) Find y -coordinates of inflection points.

First Example: $f(x) = -x^4 + 50x^2$

- (A) } these questions were answered on Tuesday.
- (B) } (see class notes pages 3-8)
- (C) }
- (D) we need to analyze sign behavior of f'' .

$$f(x) = -x^4 + 50x^2$$

$$f'(x) = -4x^3 + 100x$$

$$f''(x) = -12x^2 + 100$$

factor $f''(x)$ to get the partition numbers

Factor out -12

$$\begin{aligned}
 f''(x) &= -12 \left(x^2 - \frac{100}{12} \right) \\
 &= -12 \left(x^2 - \frac{25}{3} \right) \quad \text{simplified}
 \end{aligned}$$

