

MATH 1743
Section 900
4/23/2012
Quiz 2

Name: Key

1. The revenue of a certain company x years since 2001 in thousands of dollars is given by

$$f(x) = 7.7x^3 - 56.65x^2 + 110x + 200.$$

Round answers to the hundredths place, and label answers with units.

a) Find any critical inputs for $f(x)$. Show the equation you are solving.

b) Use the graph (but you don't need to sketch it) to classify each critical input as a relative maximum or relative minimum. State your answers in ordered pairs.

In parts c and d, give both input and output.

c) Find the absolute maximum value of $f(x)$ on $[2,4]$.

d) Find the absolute minimum value of $f(x)$ on $[2,4]$.

e) Find the inflection point.

f) The inflection point is a point of (circle one):

least rapid increase

most rapid increase

least rapid decrease

most rapid decrease

1. $f(x) = 7.7x^3 - 56.65x^2 + 110x + 200$ thousand dollars
is the revenue of a certain company x years since 2001.

a) Find any critical inputs for $f(x)$.

→ find where $f'(x) = 0$ or where $f'(x)$ does not exist

$$f'(x) = 7.7 \cdot 3x^2 - 56.65 \cdot 2x + 110 \quad (\text{exists everywhere})$$
$$= 23.1x^2 - 113.3x + 110$$

equation to solve:

$$23.1x^2 - 113.3x + 110 = 0$$

(could use quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

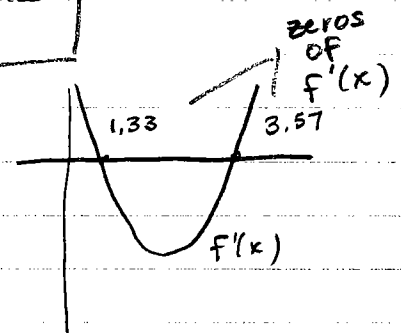
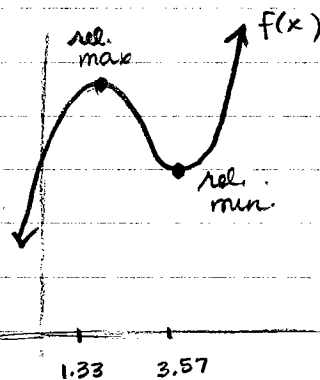
or calculator)

$$x = 1.33, 3.57$$

critical inputs:

1.33 years since 2001 and
3.57 years since 2001

b) graph looks like:



relative maximum at $(1.33, f(1.33)) = (1.33, 264.21)$
 $= (1.33 \text{ years since 2001}, 264.21 \text{ thousand dollars})$

relative minimum at $(3.57, f(3.57)) = (3.57, 221.05)$
 $= (3.57 \text{ years since 2001}, 221.05 \text{ thousand dollars})$

c) Find absolute maximum value on $[2, 4]$
 values to test:

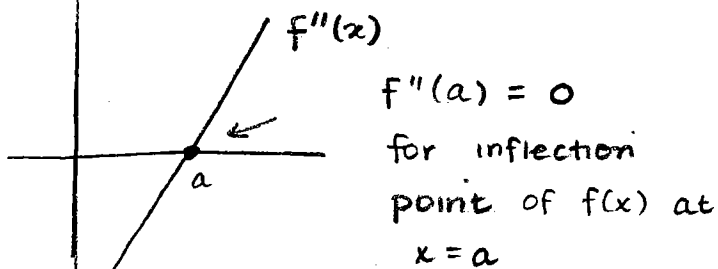
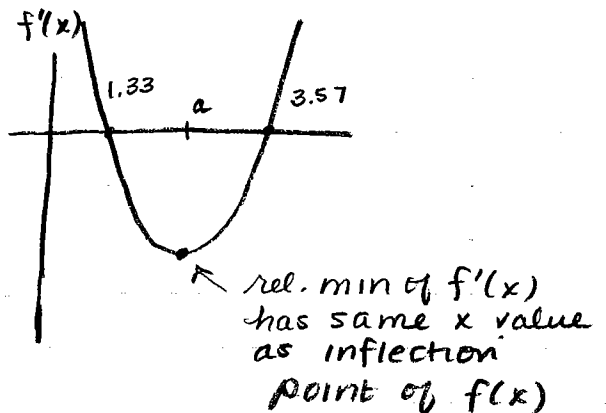
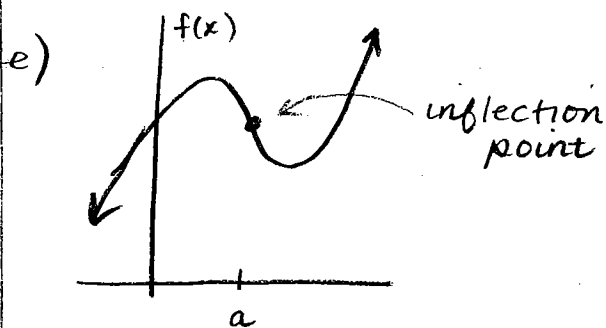
critical inputs in $[2, 4]$ and $x=2, x=4$
 $\Rightarrow x = 3.57, 2, 4$

x	$f(x)$	
2	255	← maximum
3.57	221.05	← minimum
4	226.4	

absolute maximum on $[2, 4] =$
 (2 years since 2001, 255 thousand dollars)

d) Find absolute minimum value on $[2, 4]$
 from above.

absolute minimum on $[2, 4] =$
 (3.57 years since 2001, 221.05 thousand dollars)



e) cont'd

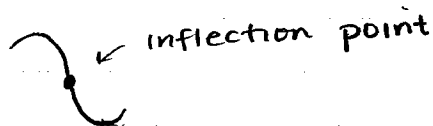
either: use your calculator to find the x -value corresponding to the minimum of $f'(x)$

or: use your calculator to find the x -value corresponding to the zero of $f''(x)$.

$$\Rightarrow x = 2.452381$$

inflection point = (2.45 years since 2001, 242.63 thousand dollars)

f)



around this point, the function is decreasing
it is decreasing the fastest here (has the steepest
tangent line)

\Rightarrow most rapid decrease