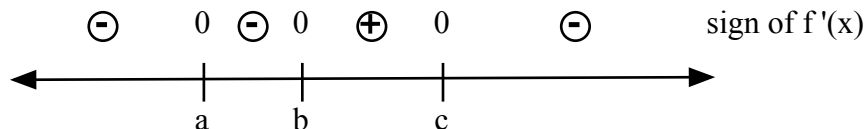


1. Assume that f is a differentiable function. The sign of $f'(x)$ is shown on the following chart.



a. Complete the following sentences (the words positive, negative, increasing, and/or decreasing are relevant).

$f'(x)$ is _____ on $(-\infty, a)$, (a, b) , and $(c, +\infty)$,

and $f'(x)$ is _____ on (b, c) .

So (by Theorem 5.5),

$f(x)$ is _____ on _____,

and $f(x)$ is _____ on _____.

b. How many critical points does f have?

c. How many times does f' change sign (from positive to negative, or vice versa)?

d. How many relative minima does f have?

e. How many relative maxima does f have?

f. Make a rough sketch of the graph of $f(x)$ showing the correct increasing/decreasing behavior.

For the remaining questions, assume $f(x)$ is a polynomial. Be careful - these questions may be tricky!

g. Describe the end behavior of f as we would have done earlier in the semester: f is _____ to the left and _____ to the right.

h. True/False: The function $f(x)$ must have at least one real zero. (Explain!)

i. What's the smallest possible degree $f(x)$ could have?
(As always, explain!)

2. Suppose $f'(x) = -2x^2(x - 3)$.

a. Make a chart showing the critical numbers of f and the sign of f' on the remaining intervals.

b. How many critical numbers does f have? What are they?

c. How many times does f' change sign (from positive to negative, or vice versa)?

d. How many relative minima does f have? (Where do they occur, if at all?)

e. How many relative maxima does f have? (Where do they occur, if at all?)

3. Let $f(x) = x^4 + 2x^2$.

a. Make a chart showing the critical numbers of f and the sign of f' on the remaining intervals.

b. How many critical numbers does f have? What are they?

c. How many times does f' change sign (from positive to negative, or vice versa)?

d. How many relative minima does f have? (Where do they occur, if at all?)

e. How many relative maxima does f have? (Where do they occur, if at all?)

4. Further suggested reading and practice (taken from the suggested reading from this week):

Read Sec 5.1 p314-318.

Work through Ex. 2 and 3 on p317-318 (meaning, after you have read through them, copy the problem out and rework it on your own to see if you've really understood and remembered the process).

Book Exercises: Sec 5.1 (p319) #1-13 - it's not a lot; most of these are answered just by looking at a graph, without any calculating. But you'll need to understand the terms and definitions from the reading!

Read: Sec 5.3 p329-334.

Memorize statements of Theorems 5.5 and 5.6. Write them down on your index card cheat sheet if you wish.

Work through Examples 1-4 as described above (read, understand, copy the problem, and rework on your own).

Book Exercises: Sec 5.1 p319 #14,16, 17, 19, 21, 45, 46, 47-50 (many of these are graphical exercises that don't require a lot of calculation); Sec 5.3 p335 #1,3,8,11,15,17,19