

Math 4 Honors
Unit 6 Extra Practice

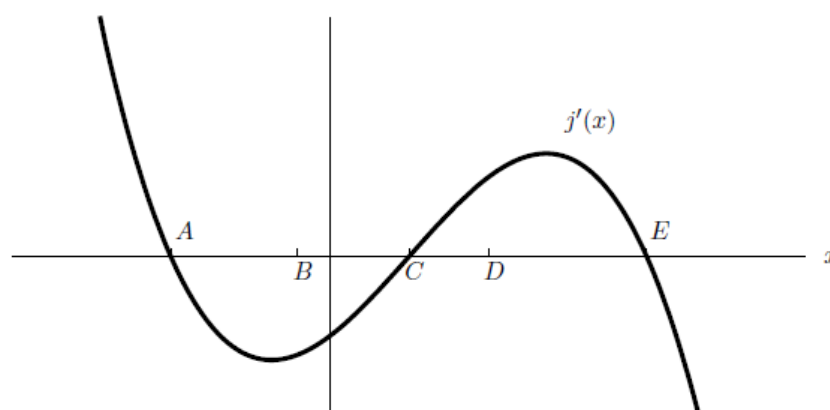
Name _____
Date _____

*The problems on this worksheet are former college course and AP Calculus exam problems.
All problems are NO CALCULATOR.*

Math 115 / Exam 2 (March 21, 2013)

page 2

1. [12 points] Consider the graph of $j'(x)$ given here. Note that this is not the graph of $j(x)$.

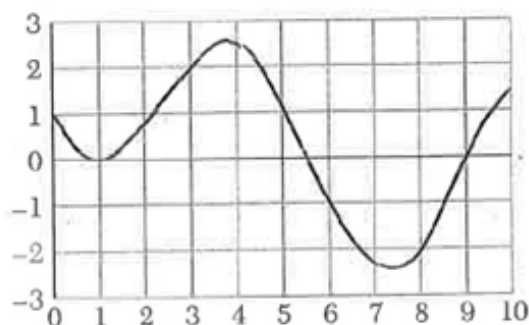


For each of (a)-(f) below, list all x -values labeled on the graph which satisfy the given statement in the blank provided. If the statement is not true at any of the labeled x -values, write "NP". You do not need to show your work. No partial credit will be given on each part of this problem.

- (a) The function $j(x)$ has a local minimum at $x =$ _____.
- (b) The function $j(x)$ has a local maximum at $x =$ _____.
- (c) The function $j(x)$ is concave up at $x =$ _____.
- (d) The function $j(x)$ is concave down at $x =$ _____.
- (e) The function $j'(x)$ has a critical point at $x =$ _____.
- (f) The function $j''(x)$ is greatest at $x =$ _____.

The graph of the derivative of a function g is shown below. Use the graph of g' to answer the following questions about g . [NOTE: The graph of g is not shown.]

Graph of g'

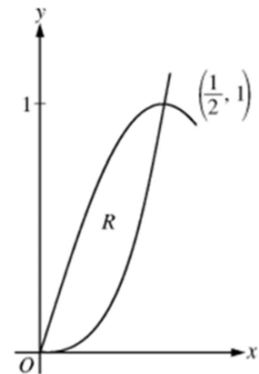


- Where does g have stationary points?
- Where does g have local maxima? Local minima?
- The graph of g' has a local maximum at $x = 3.8$ and a local minimum at $x = 7.4$. What do these facts say about the graph of g ?
- Is g concave up or concave down at $x = 5$? At $x = 8$? Justify your answers.

OVER →

3. Let R be the region in the first quadrant enclosed by the graphs of $f(x) = 8x^3$ and $g(x) = \sin(\pi x)$, as shown in the figure above.

(a) Write an equation for the line tangent to the graph of f at $x = \frac{1}{2}$.



3. Let f be the function with derivative defined by $f'(x) = x^3 - 4x$. At which of the following values of x does the graph of f have a point of inflection?

(A) 0 (B) $\frac{2}{3}$ (C) $\frac{2}{\sqrt{3}}$ (D) $\frac{4}{3}$ (E) 2

1. When is the graph of $f(x) = \frac{1}{6}x^4 - \frac{7}{6}x^3 + \frac{5}{2}x^2 - 8x + 12$ concave down?

A) $x < 1$ or $x > \frac{5}{2}$ B) $1 < x < \frac{5}{2}$ C) $x < \frac{1}{2}$ or $x > 5$
 D) $\frac{1}{2} < x < 5$ E) The graph is never concave down

3. Let g be the function defined by $g(x) = x^4 + 4x^3$. How many relative extrema does g have?

(A) Zero (B) One (C) Two (D) Three