Name: _____ Date: _____ Period: ____ Row: _____ Assn #: ____

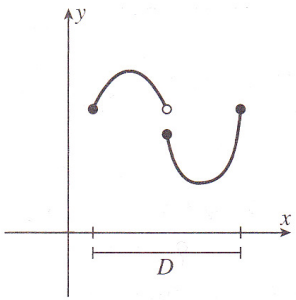
REVIEW OF SECTIONS 4.1-4.3

SHOW WORK ON A SEPARATE SHEET OF PAPER

SECTION 4.1

3) Where does the absolute minimum value occur for $f(x) = 9 - x^2$ with domain $[-2, 2]$?

4) Does the Extreme Value Theorem guarantee that the extreme values exist for the function graphed?

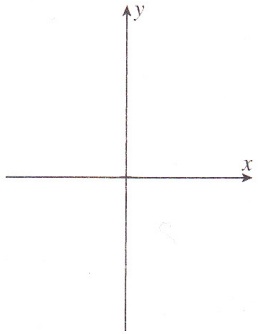


5) True or False:
If f has domain $[a, b]$, $c \in (a, b)$, and f has an absolute minimum at $x = c$ then f has a local minimum at $x = c$.

10) Find the extreme values of $f(x) = \sqrt{10x - x^2}$ on $[2, 10]$.

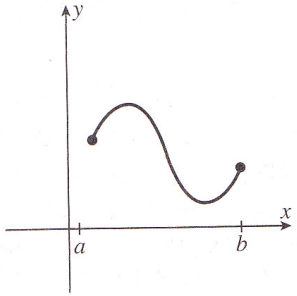
12) Find the extreme values of $f(x) = 2x + \sin x$ on $[0, 2\pi]$.

13) Sketch a function f on a closed interval for which extrema do not exist.



SECTION 4.2

3) Mark on the x-axis the point(s) c in the conclusion of the Mean Value Theorem for the function below.



4) David is driving on an interstate highway which has a speed limit of 55 mi/hr. At 2 p.m. he is at milepost 110 and at 5 p.m. he is at milepost 290. Is this enough evidence to prove that David is guilty of speeding?

5) Find all numbers c that satisfy the conclusion of the Mean Value Theorem for $f(x) = x^3 - 3x^2 + x$ on $[0, 3]$.

6) Suppose $f'(x) \leq 2$ for all x. If $f(1) = 8$ what is the largest possible value that $f(5)$ could be?

7) True or False: If $f'(x) = g'(x)$, then $f(x) = g(x)$.

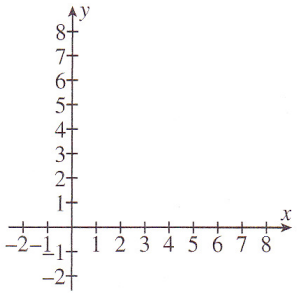
SECTION 4.3

3) Sketch a graph of a differentiable function having all these properties:

i) $f(0) = 1, f(2) = 3, f(5) = 0,$

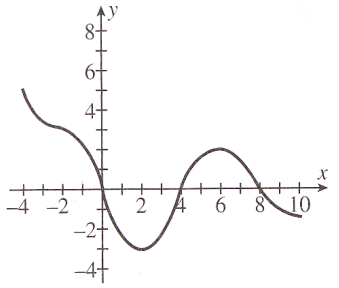
ii) $f'(x) > 0$ for $x \in (0, 2)$ and $x \in (5, \infty)$,

iii) $f'(x) < 0$ for $x \in (-\infty, 0)$ and $x \in (2, 5)$.



8) Find where the local maximum and minimum values occur for $f(x) = x + \sin x$.

9) Use the graph below to answer true or false to each.



a) $f''(x) > 0$ for $x \in (2, 4)$

b) $f''(x) < 0$ for $x \in (-4, -2)$

c) $f''(6) = 0$

d) $f''(2) > 0$

e) f is concave upward on $(0, 2)$

11) What are the points of inflection for the function in question 9)?

14) Sketch a graph of a function f having all these properties:

i) $f(-1) = 4, f(0) = 2, f(2) = 1, f(3) = 0$

ii) $f'(x) \leq 0$ for $x < 3$ and

iii) $f'(x) \geq 0$ for $x > 3$.

iv) $f''(x) < 0$ for $0 < x < 2$ and

v) $f''(x) \geq 0$ elsewhere.