



Test #3

Instructor: _____

Name: (print neatly) _____

(sign) _____

1. (30 pts) Consider the function $f(x) = \frac{x^5 - 5x^3 + 10x}{6}$.

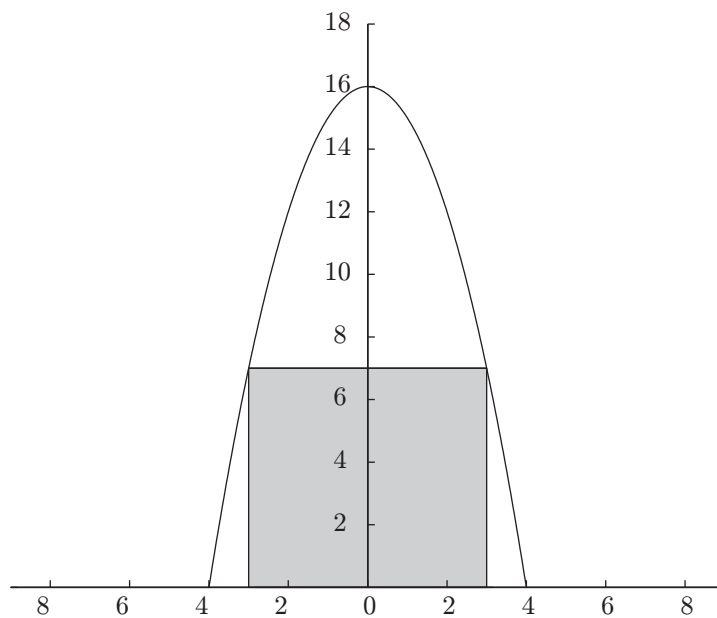
a) Determine the maximum and minimum values of $f(x)$ on the closed interval $[1, 4]$?

b) Determine the maximum and minimum values of $f(x)$ on the open interval $(0, 4)$?

2. (10 pts) Suppose a point is moving along the curve $y = x^2$, and that at $t = 1$ the point is at $(2, 4)$ and moving such that $\frac{dx}{dt} = -2$ units/sec. At $t = 1$, is the length of the straight segment from the point on the curve to $(0, 7)$ increasing or decreasing?

3. (20 pts) Find the dimensions of the rectangle of largest area that can be inscribed between the parabola $y = 16 - x^2$ and the x -axis.

[Be sure that you provide a sound and complete argument for you conclusion.]



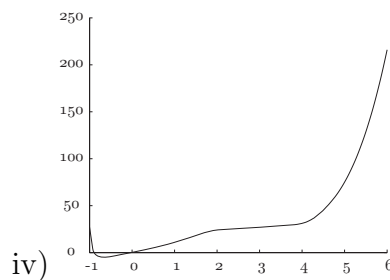
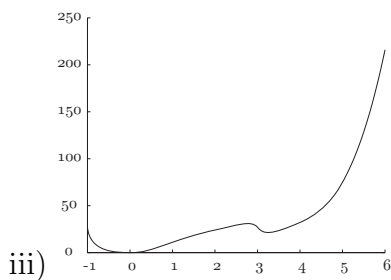
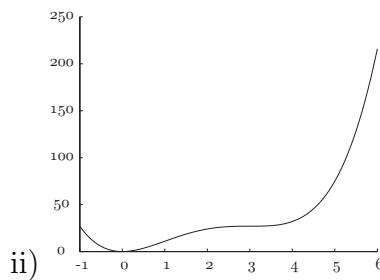
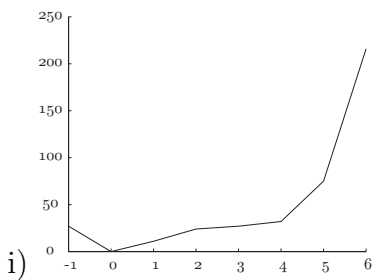
4. (20 pts) Let $f(x) = x^4 - 8x^3 + 18x^2$.

a) Find all critical values of $f(x)$ and apply either the first or second derivative test to classify each as a local maximum, local minimum, or neither.

b) Find all inflection values of $f(x)$.

c) Which of the following graphs most closely shows the behavior of $f(x)$

i) _____ ii) _____ iii) _____ iv) _____



5. (20 pts) The graph of $f(x)$ is given at the bottom of the page.

a) Place a filled dot, \bullet , over each critical point on the graph and label them with lower case letters, a, b, c, \dots , from left to right.

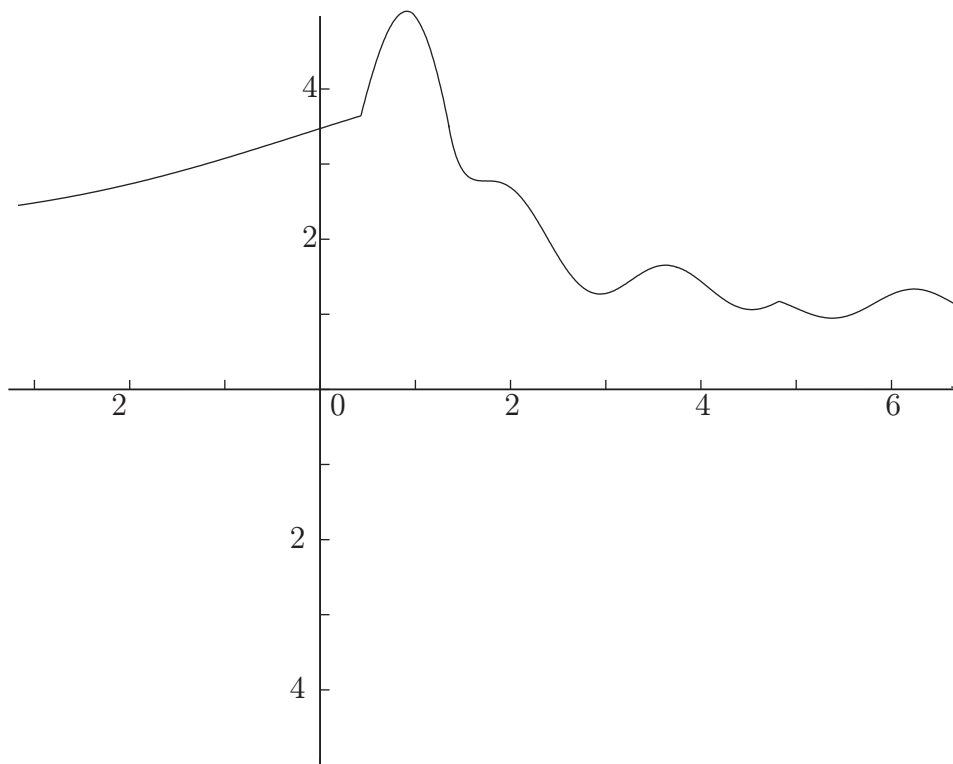
b) Place an open dot, \circ , over each inflection point on the graph and label them with upper case letters, A, B, C, \dots , from left to right.

c) List *all* labelled points which are local maxima, _____.

d) Give the label of a local maximum at which the second derivative test can not be applied, _____.

e) Give the label of a critical point at which the second derivative test would be inconclusive, _____.

f) Give two labelled points such that the arc between them is concave up and decreasing, _____.



Prob	Pts
1	
2	
3	
4	
5	
Total	