Math 1314  
Homework 13

Submit your answer choices before the deadline under “Homework 13” in your CASA account.

1. The following graph is the graph of the first derivative of a function $f$ whose domain is $(-\infty, \infty)$. Find any critical numbers.

A. No critical numbers.  
B. $x = -1$  
C. $x = 0$  
D. $x = 1$  
E. None of the above.

Use the following graph to answer questions 2 – 4.
The following graph is the graph of the first derivative of a function $f$ whose domain is all real numbers except -1 and 2.

2. Find any critical numbers.

A. No critical numbers.  
B. $x = -1$, $x = 1$, $x = 2$  
C. $x = -1$, $x = 2$  
D. $x = 1$  
E. None of the above.
3. Over how many intervals is the function $f$ decreasing?

A. None  
B. One  
C. Two  
D. Three  
E. Four  

4. How many relative extrema does the function $f$ have?

A. None  
B. One  
C. Two  
D. Three  
E. Four  

Use the following graph to answer questions 5 & 6.
The following graph is the graph of the second derivative of a function $f$ whose domain is all real numbers except 1.

5. Give any intervals over which $f$ is concave up.

A. $(1, \infty)$  
B. $(-\infty, 1) \cup (1.7937, \infty)$  
C. $(-\infty, 1)$  
D. None of the above.

6. How many points of inflection does the function $f$ have?

A. None  
B. One  
C. Two  
D. Three
Use the following function to answer questions 7 & 8.

\[ f(x) = x^2 + (x-1)^{\frac{2}{3}} - 2(x+1)^{\frac{1}{3}} \]

7. Over how many intervals is the function \( f \) concave down?
   A. None
   B. One
   C. Two
   D. Three
   E. Four

8. Find any points of inflection for function \( f \).
   A. \((-1.4142, 5.2904), (0.8186, -1.4507), (1.1842, -0.8689)\)
   B. \((-1, 2.5874)\)
   C. \((-1, 2.5874), (1, -1.5198)\)
   D. \((-1.4142, 5.2904), (0.8186, -1.4507), (1.1842, -0.8689), \) and \((-1, 2.5874)\)
   E. None of the above.

9. Problem 4.6.64 Give any intervals over which the function \( f \) is concave up.
   A. \((0, 6.3397) \cup (23.6603, \infty)\)
   B. \((0, 6.3397)\)
   C. \((-\infty, 0) \cup (6.3397, 23.6603)\)
   D. \((6.3397, 23.6603)\)
   E. None of the above.

10. Problem 4.6.64 How many points of inflection does the function \( f \) have?
    A. None
    B. One
    C. Two
    D. Three
    E. Four