

**REVISIONS: RECOMPREHENSIVE EXERCISES (2008)**

**Exam 1/09 – Short Answer and Essay Questions**

**QUESTION 1**

Characterize the domain of the function and the use of the first and/or second derivative tests to determine the intervals of increasing and decreasing and local extrema. Explain in detail the steps you take to solve the problem. Be sure to include the domain and the intervals of increasing and decreasing and the intervals of local extrema.

Describe the main features of the graph of the function: local extrema, intervals of increasing and decreasing. They are determined using both the first and second derivatives. There is one local maximum and one local minimum. The function is increasing on the intervals  $(-\infty, -1)$  and  $(1, \infty)$  and decreasing on the interval  $(-1, 1)$ .

Describe the main features of the graph of the function: local extrema, intervals of increasing and decreasing. They are determined using both the first and second derivatives. There is one local maximum and one local minimum. The function is increasing on the intervals  $(-\infty, -1)$  and  $(1, \infty)$  and decreasing on the interval  $(-1, 1)$ .

**QUESTION 2**

Graph the function  $f(x) = x^3 - 3x^2 + 2x$ . Label the x and y axes. Indicate the intervals of increasing and decreasing and the intervals of local extrema.

1. The graph of  $f(x)$  has a local maximum at  $x = 1$  and a local minimum at  $x = 2$ .

- A.  $x = 1$  and  $x = 2$
- B.  $x = 1$  and  $x = 2$
- C.  $x = 1$  and  $x = 2$
- D.  $x = 1$  and  $x = 2$

2. The graph of  $f(x)$  has a local maximum at  $x = 1$  and a local minimum at  $x = 2$ .

- A.  $x = 1$  and  $x = 2$
- B.  $x = 1$  and  $x = 2$
- C.  $x = 1$  and  $x = 2$
- D.  $x = 1$  and  $x = 2$

3. The graph of  $f(x)$  has a local maximum at  $x = 1$  and a local minimum at  $x = 2$ .

- A.  $x = 1$  and  $x = 2$
- B.  $x = 1$  and  $x = 2$
- C.  $x = 1$  and  $x = 2$
- D.  $x = 1$  and  $x = 2$

4. The graph of  $f(x)$  has a local maximum at  $x = 1$  and a local minimum at  $x = 2$ .

- A.  $x = 1$  and  $x = 2$
- B.  $x = 1$  and  $x = 2$
- C.  $x = 1$  and  $x = 2$
- D.  $x = 1$  and  $x = 2$