

MATH-1150 (DUPRÉ) SPRING 2011 QUIZ 5

Wednesday 19 March 2012

DIRECTIONS

FIRST: PRINT YOUR LAST NAME IN LARGE CAPITAL LETTERS ON THE UPPER RIGHT CORNER OF EACH SHEET TURNED IN.

SECOND: PRINT YOUR FIRST NAME IN CAPITAL LETTERS DIRECTLY UNDERNEATH YOUR LAST NAME ON EACH SHEET TURNED IN.

THIRD: WRITE YOUR CORRECT SPRING 2011 MATH-1150 SECTION NUMBER DIRECTLY UNDERNEATH YOU FIRST NAME ON EACH SHEET TURNED IN.

FOURTH: Write NEATLY and CLEARLY, putting your answers in the space provided. If I cannot read it you do not get credit.

FIFTH: Any failure to follow any part of any of the above directions can result in additional loss of credit.

Suppose  $f(x) = x^3 - 6x^2 + 9x$ . Notice that in fact  $f(x) = x(x - 3)^2$ , so we can use this formula to quickly calculate values of  $f$ , and we see

$$f(0) = 0, f(1) = 4, f(2) = 2, f(3) = 0, \text{ and } f(4) = 4.$$

The calculation of the derivative of  $f$  results in

$$f'(x) = 3x^2 - 12x + 9 = 3(x^2 - 4x + 3) = 3(x - 1)(x - 3).$$

The second derivative is

$$f''(x) = 6x - 12 = 6(x - 2).$$

1. Give all values of  $x$  for which  $f(x) = 0$ .
2. Give all values of  $x$  for which  $f'(x) = 0$ .
3. Give all values of  $x$  for which  $f$  has a local maximum value at  $x$ .
4. Give all values of  $x$  for which  $f$  has an inflection point at  $x$ .
5. Sketch the graph of  $f$  using the information above as well as the information from problems 1,2,3,4.