Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

1. Consider the following function:

$$f(x) = x^3 - 3x^2 = x^2(x-3)$$

   Its first and second derivatives are given by:

$$f'(x) = 3x(x-2) \text{ and } f''(x) = 6(x-1)$$

   (a) Find the intervals where f is increasing and where f is decreasing.

   (b) Find any local extrema. Give both the x and y values. Indicate if it is a max or min.

   (c) Find the intervals where f is concave up and where f is concave down.

   (d) Find the inflection point(s) of f. Give both the x and y values.