

Name: _____

Show all work, simplify, and box your answers. If you do the problem incorrectly, or don't show sufficient work, you will be asked to rewrite the problem for full credit.

Due next class. Students who turn assignments in late (or do not attempt a problem) forfeit their ability to rewrite those problems for credit.

- Answer the following questions about the function whose **derivative** is given by $f'(x) = x(x - 1)$:
 - What are the critical points of f ?
 - On what intervals is f increasing or decreasing?
 - At what points, if any, does f assume local maximum and minimum values?
- Let $h(r) = (r + 7)^3$
 - State the intervals on which the function is increasing and decreasing.
 - Then identify the function's local extreme values, if any.
- Let $f(x) = \frac{x^3}{3x^2 + 1}$
 - Find the intervals on which the function is increasing and decreasing.
 - Identify the function's local extreme values, if any.
- Identify the inflection points and local maxima and minima of the function. Identify the intervals on which the function is increasing, decreasing, concave up and concave down:

$$y = \frac{x^3}{3} - \frac{x^2}{2} - 2x + \frac{1}{3}$$

- Discuss the shape of $y = x^3 - 3x + 3$ using derivatives. Make sure to state the coordinates of any local extreme points and inflection points.