Math 241 Fall 2017 Dr. Hadari
Classwork 8 Name: _____

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise. If you finish early, you may leave with my approval.

**1.** (*0 points*) Consider the function $f(x) = x^4 - 4x^3$

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

(b) Find both coordinates of any local extrema of the graph of $f$.

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

(d) Find both coordinates of the inflection points of $f$.

(e) Using the above information, sketch the graph of $y = f(x)$ on the coordinate axes below. You must label both coordinates of any local extrema and inflection points on your graph. (The graph does not need to be to scale.)

**2.** **(*0 points*)** Sketch the graph of a single function that has all of the properties listed:

(a) Continuous for all real numbers

(b) $f'(x) > 0$ on $(-\infty, -2)$ and $(0, 3)$

(c) $f'(x) < 0$ on $(-2, 0)$ and $(3, \infty)$

(d) $f''(x) < 0$ on $(-\infty, 0)$ and $(0, 5)$

(e) $f''(x) > 0$ on $(5, \infty)$

(f) $f'(-2) = f'(3) = 0$

(g) $f'(0)$ doesn't exist

(h) Differentiable everywhere except at $x = 0$

(i) An inflection point at $(5, 1)$