HOMEWORK 7

Instructions: Do the following exercises. Because we have a test on Friday, March 3, this assignment is due in class on Wednesday.

- From Stewart's *Calculus*, Section 2.9: 1-4, 11, 21, 24, 25, 26
    (for 24(a), you don't need to use the definition of the derivative)

- Using the techniques we've developed in class, find $\dfrac{d}{dx}\left[\log_a(x)\right]$ (hint: use the identity $a^{\log_a(x)} = x$).

- For each of the following functions,
    find the intervals on which the function is increasing/decreasing
    find the intervals on which the function is concave up/ concave down
    find all *possible* local extrema (maxima and minima) of the function
    find which of the possible local extrema *are* local extrema
        (be sure to say whether they locally maximize or minimize the function, and include justification)

(1) $\sqrt[3]{x}$

(2) e^{x^2}

(3) $x^3 - x$

(4) $x\ln(x) - x$ (NB: this function is only defined on $(0, \infty)$).