Homework 2
due on 1st class of week 8

Problem 1 (3 points)
Compute derivatives of the following functions using quotient rule:
[a] \( f(x) = \frac{x}{2x+5} \)  
[b] \( f(x) = \frac{5x+7}{2-x} \)  
[c] \( f(x) = \frac{x+1}{x^2+1} \)

Problem 2 (3 points)
Compute derivatives of the following functions using chain rule:
[a] \( f(x) = (x^2+5)^8 \)  
[b] \( f(x) = \sqrt{x^8+10x^2+16} \)

Problem 3 (4 points)
Given the following relation: \( x^3 + y^2 - 4 = x^2 + y \) (almost identical to the example in lecture)
[a] Compute implicit derivative \( \frac{dy}{dx} \) (or \( y' \)).
[b] Check that \( x = 2, y = 1 \) satisfy the relation
[c] Evaluate \( y' \) at \( x = 2, y = 1 \) (just plug these values in the answer you get for [a]).
[d] Find the tangent line of the curve (i.e. graph of this relation) at \( x = 2, y = 1 \) (hint: you know the slope from [c], and you know the point, use point-slope equation)