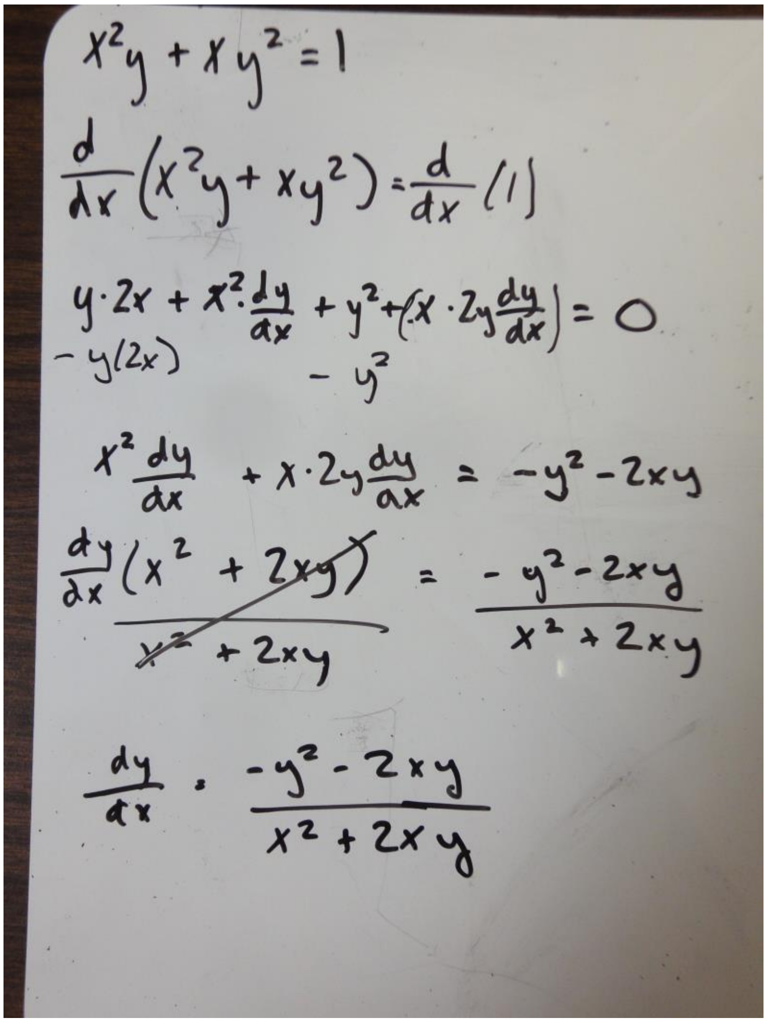
Problem 1 (done in class). What is neat about this one is you can conclude that the radial line and the tangent line are perpendicular (they meet at a ninety-degree angle). That is,

$m_{\text{radial line}} \cdot m_{\text{TL}} = \frac{y}{x} \cdot \left(-\frac{x}{y} \right) = -1$. This is the geometric interpretation.

Problem 2. See below.



Problem 3. (Also done in class). What is neat about this one is we obtain a derivative for a function we have previously studied in trigonometry. $\sin y = x$ translates to

$y = \sin^{-1} x = \arcsin x$ and we found its derivative to be $\frac{dy}{dx} = \frac{1}{\sqrt{1-x^2}}$.