Warm-up Problems

1. Find the derivatives.

   (a) $\frac{d}{dx}(x) =$

   (b) $\frac{d}{dx}(y) =$

2. The equation of the unit circle is $x^2 + y^2 = 1$. Find the equation of the line tangent to the unit circle when $x = 0$.

3. Find the derivative of $y = \sqrt{1 - x^2}$.

Lecture Problems

4. Use implicit differentiation.

   (a) $10x^2 + y^2 = 25$. $y' =$

   (b) $x^3 + y^3 = 4$. $y' =$

   (c) $3\sin(x + y) = x$. $y' =$

   (d) $x^3 y^5 + 3x = 8y^3 + 1$. $y' =$

5. Find y'' for your derivatives from Problem 4.

   (a) $y'' = -\frac{10y^2 + 100x^2}{y^3}$

   (b) $y'' =$

   (c) $y'' =$

   (d) $y'' =$

6. Maybe a little easier? Find y'.

   (a) $\sin y = x$. $y' =$

   (b) $\cos y = x$. $y' =$

   (c) $\tan y = x$. $y' =$

   (d) $\sec y = x$. $y' =$

   (e) $\csc y = x$. $y' =$

   (f) $\cot y = x$. $y' =$

7. Find the derivatives.

   (a) $y = x\tan^{-1} x$. $y' =$.

   (b) $y = 5\sin^{-1} 2x - 13\cos^{-1} x^2$. $y' =$

   (c) $y = \tan^{-1} x \sin^{-1} x$. $y' =$