Worksheet 14: Implicit Differentiation

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1. Using Leibniz notation, find the derivative of $x^2 + y^2 = 1$ without solving for y. Why is Leibniz notation good for implicit differentiation?

2. Write out the derivatives of the inverse trigonometric functions; what patterns do you see?

3. Find the derivative:

   (a) $x^3 + y^3 = 6xy$

   (b) $f(x) = \arcsin(x^3 + 1)$

   (c) $xe^y = x - y$

   (d) $y = e^{cot^{-1}(x^2)} + x^3$

   (e) $\tan(x - y) = \frac{y}{1+x^2}$

4. Use implicit differentiation to find an equation of the tangent line to the curve $\sin(x+y) = 2x - 2y$ at the point (π, π).