

SECTION 3.5 IMPLICIT DIFFERENTIATION

1. Find $\frac{dy}{dx}$ for each of expression below by implicit differentiation.

(a) $2x + 3y = 5xy + y^{1/3}$

(b) $y \sin(x) = x^2 - y^2$

(c) $e^{xy} = x + y + 1$

2. You are going to derive the formula for the derivative of arc tangent the way we derived the derivative for arc sine at the beginning of class.

(a) Find dy/dx for the expression $x = \tan(y)$.

(b) Use the identity $1 + \tan^2(\theta) = \sec^2(\theta)$ to rewrite your answer in part (a) and *write your dy/dx in terms of x only*.

(c) Now fill in the blank $\frac{d}{dx} [\arctan(x)] =$

(d) Use your knowledge of the *graph* of $f(x) = \arctan(x)$ to decide if your answer seems plausible...

3. Find the derivative of $f(x) = \arctan(\sqrt{4 - x^2})$.