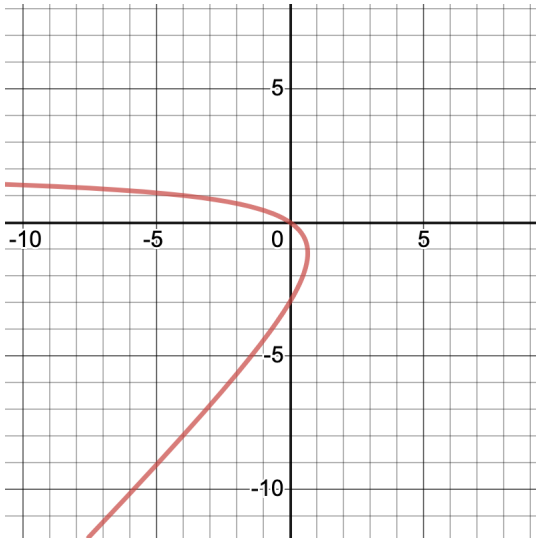


SECTION 3.5 IMPLICIT DIFFERENTIATION

1. Find $\frac{dy}{dx}$ for $2x + 3y = xy - y^2$ and find the equations of tangents to the graph when $x = 0$. Use the graph below as an aid and to determine the plausibility of your answers.



2. Find $\frac{da}{db}$ for $a^3 \sin(3b) = a^2 - b^2$

3. Find $\frac{dy}{dx}$ for $e^{xy} = x + y + 1$

4. You are going to derive the formula for the derivative of inverse tangent the way we found the derivative of inverse sine in 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...

5. Find the derivative of $f(x) = x \arctan x$.

6. Find the derivative of $f(x) = \arctan(4 - x^2)$.