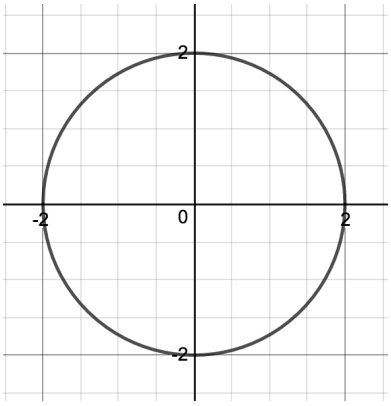
Name: _____

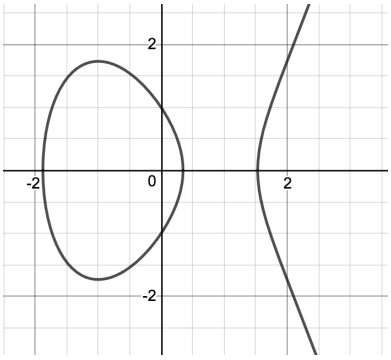
3.7 Implicit Differentiation

1. Find the points on the curve $x^2 + y^2 = 4$ where the slope of the tangent line is equal to 1.



2. Find the equation of the tangent line to the curve $y^3 - xy + 6 = 0$ at $(7, 2)$.

3. The implicitly defined function $y^2 = x^3 - 3x + 1$ is shown below. Find the location of any points where the tangent line is horizontal.



4. At pressure P atmospheres, a certain fraction f of a gas decomposes.The quantities P and f are related, for some positive K, by the equation

$$\frac{4f^2P}{1-f^2} = K$$

(a) Find $\dfrac{df}{dP}$

(b) Show that $\frac{df}{dP} < 0$ always. What does this mean in practical terms?

5. Find $\dfrac{dy}{dx}$ for each of the following implicitly defined functions.

(a) $yx^2 + 2y = y^2 + 1$

(b) $x^2y^2 + x\sin(y) = 4$

(c) $\dfrac{1}{e^{x^2+y^2}} = e$