Short Calculus (MATH 1142)  Implicit Differentiation

Use implicit differentiation to find the slope of the tangent line to the curve at the given point, then name the shape.

1. $x^2 + xy + y^2 = 3$ at the point $(1, 1)$ (Bonus: what is the name of this curve?)

2. $x^2 + 2xy - y^2 + x - 2$ at the point $(1, 2)$ (Bonus: what is the name of this curve?)

3. $x^2 + y^2 = (2x^2 + 2y^2 - x)^2$ at the point $(0, \frac{1}{2})$ (Bonus: what is the name of this curve?)

Practice on your Own

For each of the following problems, find $y'$ by implicit differentiation. Then check your work by solving for $y$ and taking the derivative in the usual way. Then compare your answers to make sure you’re correct.

1. $xy + 2x + 3x^2 = 4$

2. $4x^2 + 9y^2 = 36$

3. $\frac{1}{x} + 1y = 1$