Math 1A: Discussion 10/17/2018 Problems

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After this week, you should know:

- Take complicated derivatives.
- Use implicit differentiation to find the derivative of curves.
- Use logarithmic differentiation to find derivatives of functions with variables in both the base and exponent.

Question 1

Find the slope of the tangent line to the following curves at the specified point.

- $x^2 - xy + y^2 = 1$ at $(1, 1)$
- $x^3y + x^2y^2 = 1 - y^4$ at $(1, -1)$
- $\ln(x)\ln(y) = 1$ at (e, e)

Find a formula for $\frac{dy}{dx}$ for the following relations.

- $\sin(x)\arctan(y) + e^{xy} = 1$
- $\sqrt{x}e^{\sin(y)} + x^2e^{2y} + \tan(y) = 0$

Question 2

Find the derivatives using logarithmic differentiation.

$$f(x) = x^{\sqrt{x}}$$
$$f(x) = (x^2 + 1)^{\cos(x)}$$
$$f(x) = (2 + \arctan(x))^{\arctan(x)}$$
$$f(x) = (x^4 + 1)^{(\ln(x)+e^x)}$$
$$f(x) = x^{(x^x)}$$