Math 1300-001, Quiz 5 Name: _____

1. What are the derivatives of the following functions? (You should know all of these!)

   (a) $\ln x$ and $\log_3 x$

   (b) e^x and 3^x

   (c) $\tan x$ and $\arctan x$

2. Find the derivative of

$$y = \sin(\ln(3x^2 + 2))$$

3. Use implicit differentiation to find the equation of the tangent line to the curve

$$2(x^2 + y^2)^2 = 25(x^2 - y^2)$$

going through the point $(3, 1)$.

4. (If you have time...) Find the derivative of arccot x as follows:

   (a) Differentiate
   $$\cot(\operatorname{arccot} x) = x$$
   using the chain rule and solve for $\dfrac{d}{dx}(\operatorname{arccot} x)$ (recall that $\dfrac{d}{dx}(\cot x) = -\csc^2 x$).

   (b) Draw a triangle to write $\csc(\operatorname{arccot} x)$ as an algebraic function of x (recall that cotangent is adjacent/opposite and cosecant is hypoteneuse/opposite).