

Name: \_\_\_\_\_ / 25

There are 25 points possible on this quiz. No aids (book, calculator, etc.) are permitted. **Show all work for full credit.**

1. [15 points] Find  $\frac{dy}{dx}$  for each expression below.

a.  $y = 10 \arctan(2x)$

b.  $y = x \sin^{-1}(x)$

c.  $y = \ln(2x + 1)$

d.  $y = e^{-x} + 2e^{x^2} + 3e^2$

e.  $y = e^{\ln(x)}$

2. [2 points] Write the formula for  $\frac{d}{dx} [f(g(h(x)))]$ .

3. [3 points] Use **logarithmic differentiation** to find the derivative of  $y = \left( \frac{x^2 + 1}{\sin(x) + 1} \right)^5$

4. [5 points] The graph of the equation  $x^3 + y^2 = 3xy$  is drawn below. Write an equation of the line tangent to the curve at the point  $(2, 2)$  and sketch the tangent line on the graph.

