

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 the derivative of each function. You do not need to simplify your answer.

(a) $g(\theta) = 5 \arcsin(2\theta)$

(b) $f(x) = e^x \tan^{-1}(x)$

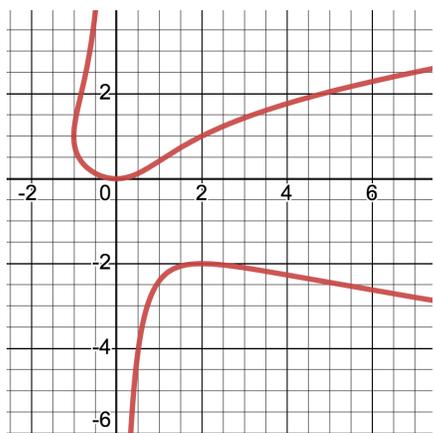
(c) $x(t) = \ln(t^3 + 1)$

(d) $f(x) = x^{2/3} + e^{-3x}$

(e) $h(x) = e^2 + (\cos(x))^{-1}$

2. (4 points) Use logarithmic differentiation to find $\frac{dy}{dx}$ for the function $y = \frac{x^2 \sin^2(x)}{x^2+5}$. (Recall that logarithmic differentiation is the technique that involves taking the logarithm of both sides.)

3. (6 points) The graph of the equation $xy^2 = x^2 - 2y$ is drawn below.



- (a) Use implicit differentiation to find $\frac{dy}{dx}$.

- (b) Find the equation of the line tangent to the curve at the point $(2, 1)$. Draw the tangent line on the graph above.