

Name: _____ / 25

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

1. [12 points] Find the derivative of each function. You do not need to simplify your answers.

a. $y = 3x^3 + 4e^x - 5 \ln(3)$

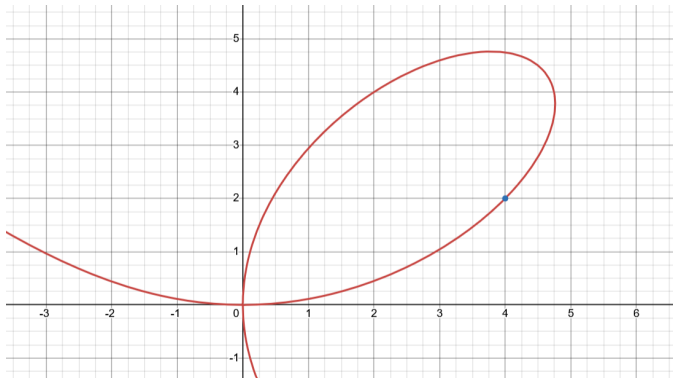
b. $f(x) = \arcsin(x^3)$

c. $g(x) = \ln\left(\frac{x^5}{\cos(x)}\right)$

d. $h(x) = 5 \sec(e^x) + \ln(e^x)$

2. [4 points] Determine if the functions $f(x) = \ln(2x)$ and $g(x) = \ln(3x)$ have the same derivative. Justify your answer.

3. [9 points] The graph of $x^3 + y^3 = 9xy$ is given below.



a. Calculate $\frac{dy}{dx}$.

b. Use $\frac{dy}{dx}$ to find the **slope** of the tangent line to the curve at $(4,2)$. **Simplify** your answer.

4. [2 points] BONUS: Given the function $f(x) = (\arctan x)^x$, find $f'(x)$.