MTH 1001 Name:

Quiz 2 Section:

1. **(8 pts)** Use implicit differentiation to find dy/dx: $e^{2x} = \sin(x + 3y)$.

2. **(12 pts)** Use implicit differentiation to find dy/dx and then d^2y/dx^2: $y^2 = e^{x^2} + 2x$.

3. **(10 pts)** Use logarithmic differentiation to find $y'(x)$: $y = \frac{x\sqrt{x^2+1}}{(x+1)^{\frac{2}{3}}}$.

4. **(10 pts)** Use logarithmic differentiation to find $y'(x)$: $y = \big(\sin x\big)^x$.

5. **(8pts)** Find dy/dx: $y = \ln\big(\arctan(x)\big)$.

6. **(12 pts)** If the original $24m$ edge length x of a cube ***decreases*** at the rate of $5\,m/min$, when $x = 3\,m$ at what rate does the cube's

a. surface area change?

b. volume change?