Name_____ No Calculators. Present neatly. Score_____.

1.

Find y' if $y = \ln\left(x^2 + y^2\right)$

Your work:

Find y' if $y = \ln\left(x^2 + y^2\right)$

$$\frac{dy}{dx} = \frac{1}{x^2 + y^2}\left(2x + 2y\frac{dy}{dx}\right)$$

$$\frac{dy}{dx} - \frac{2y}{x^2 + y^2}\frac{dy}{dx} = \frac{2x}{x^2 + y^2}$$

$$\frac{dy}{dx}\left(1 - \frac{2y}{x^2 + y^2}\right) = \frac{2x}{x^2 + y^2}$$

$$\frac{dy}{dx}\left(\frac{x^2 + y^2 - 2y}{x^2 + y^2}\right) = \frac{2x}{x^2 + y^2}$$

$$\frac{dy}{dx} = \frac{2x}{x^2 + y^2 - 2y}$$

Name_____ No Calculators. Present neatly. Score_____.

1.

Find y' if $\ln xy = y\sin x$

Your work:

Find y' if $\ln xy = y\sin x$

$$\frac{1}{xy}\left(y + x\frac{dy}{dx}\right) = y\cos x + \frac{dy}{dx}\sin x$$

$$\frac{1}{x} + \frac{1}{y}\frac{dy}{dx} - \frac{dy}{dx}\sin x = y\cos x$$

$$\frac{dy}{dx}\left(\frac{1}{y} - \sin x\right) = y\cos x - \frac{1}{x}$$

$$\frac{dy}{dx}\left(\frac{1 - y\sin x}{y}\right) = \frac{xy\cos x - 1}{x}$$

$$\frac{dy}{dx} = \frac{y\left(xy\cos x - 1\right)}{x\left(1 - y\sin x\right)}$$