

## Quiz 8: Math 135, Section C7

For each of the following, find  $\frac{dy}{dx}$ :

1.  $y = \sin e^x$
  2.  $y = \sqrt{\sin e^x}$
  3.  $xy + 2y^2 = 0$
  4.  $e^{xy} + \ln xy = x$
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1.

$$\frac{dy}{dx} = \cos e^x \cdot e^x$$

2.

$$\frac{dy}{dx} = \frac{1}{2\sqrt{\sin e^x}} \cos e^x \cdot e^x$$

3.

$$\begin{aligned} x \frac{dy}{dx} + y + 4y \frac{dy}{dx} &= 0 \\ x \frac{dy}{dx} + 4y \frac{dy}{dx} &= -y \\ \frac{dy}{dx}(x + 4y) &= -y \\ \frac{dy}{dx} &= \frac{-y}{x + 4y} \end{aligned}$$

4.

$$\begin{aligned} e^{xy} \left( x \frac{dy}{dx} + y \right) + \frac{1}{xy} \left( x \frac{dy}{dx} + y \right) &= 1 \\ e^{xy} x \frac{dy}{dx} + e^{xy} y + \frac{1}{y} \frac{dy}{dx} + \frac{1}{x} &= 1 \\ e^{xy} x \frac{dy}{dx} + \frac{1}{y} \frac{dy}{dx} &= 1 - e^{xy} y - \frac{1}{x} \\ \frac{dy}{dx} \left( e^{xy} x + \frac{1}{y} \right) &= 1 - e^{xy} y - \frac{1}{x} \\ \frac{dy}{dx} &= \frac{1 - e^{xy} y - \frac{1}{x}}{e^{xy} x + \frac{1}{y}} \end{aligned}$$