

Derivatives Review
Calculus I
June 2, 2017

Solve for $\frac{dy}{dx}$.

1. $x - \ln y = \cos(x + y)$

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

2. $xy^2 = e^{x+y}$

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

3. $y = \cos \tan \sqrt{x}$

$$\frac{dy}{dx} = \frac{-\sin \tan \sqrt{x} \sec^2 \sqrt{x}}{2\sqrt{x}}$$

4. $y = x^{\ln x}$

$$\frac{dy}{dx} = \frac{2x^{\ln x} \ln x}{x}$$

5. $y = \frac{\arctan x}{\ln x}$

$$\frac{dy}{dx} = \frac{x \ln x - x^2 \arctan x - \arctan x}{(x^3 + x)(\ln x)^2}$$

6. $y^{e^x} = x$

$$\frac{dy}{dx} = \frac{y - yxe^x \ln y}{xe^x}$$

7. $|xy| = \frac{1}{y}$

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

8. $y = \begin{cases} 3 & \text{if } x < -1 \\ 1 & \text{if } -1 \leq x \leq 1 \\ 2 & \text{if } x > 1 \end{cases}$

$$\frac{dy}{dx} = 0 \forall x \in \mathbb{R} \setminus \{-1, 1\}$$