

7. [5 points] An implicit function is described by the equation

$$\cos(xy) = 7x^2 + y.$$

Find a formula for  $\frac{dy}{dx}$  in terms of  $y$  and  $x$ . You must show every step of your work.

*Solution:*

$$-\sin(xy) \left( y + x \frac{dy}{dx} \right) = 14x + \frac{dy}{dx}$$

$$-x \sin(xy) \frac{dy}{dx} - \frac{dy}{dx} = 14x + y \sin(xy)$$

$$-\frac{dy}{dx} (x \sin(xy) + 1) = 14x + y \sin(xy)$$

$$\frac{dy}{dx} = -\frac{14x + y \sin(xy)}{x \sin(xy) + 1}$$