KEY

You have ten minutes to complete this quiz.

1. Let $x^2 = y^3 + 3y^2$. Find $\frac{dy}{dx}$.

diff both sides w.r.t. x

$$2x = 3y^2 \frac{dy}{dx} + 6y \frac{dy}{dx} \rightarrow \frac{dy}{dx} = \frac{2x}{3y^2 + 6y}$$

2. Let $xy = 3$. Find $\frac{dy}{dx}$ two ways
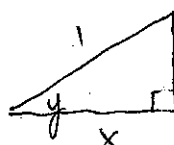
   (a) By implicit differentiation

   $$y + x \frac{dy}{dx} = 0 \qquad \frac{dy}{dx} = \frac{-y}{x}$$

   (b) By first solving for y and using derivative rules

   $$y = \frac{3}{x} = 3x^{-1} \quad \frac{dy}{dx} = -3x^{-2} = \frac{-3}{x^2} = \frac{\left(-\frac{3}{x}\right)}{x} = \frac{-y}{x} \checkmark$$

3. Let $y = \arccos(x)$. Find $\frac{dy}{dx}$ by implicit differentiation.

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

$\sin y = \frac{\sqrt{1-x^2}}{1}$

$$\frac{dy}{dx} = \frac{-1}{\sin y} \longrightarrow \frac{dy}{dx} = -\frac{1}{\sqrt{1-x^2}}$$