3.2a / Practice workbook

Implicit Differentiation: Finding dy/dx

Practice

Problems 1–6 / Show your reasoning

1 A curve is given by $y^3 + 2y = x^2 + 2$. (a) Find $\frac{dy}{dx}$. (b) Find the slope of the curve at the point $(1, 1)$.

2 A curve is given by $\ln y + xy = 2$. Find $\frac{dy}{dx}$ at the point $(2, 1)$.

3 If $xy^2 + x^3 = 10$, what is $\frac{dy}{dx}$ at the point $(1, 3)$?

A. $-\frac{1}{2}$
B. -2
C. -4
D. 2

4 For the curve $y = x + \sin y$, what is $\frac{dy}{dx}$ at the point (π, π)?

A. 0
B. $\frac{1}{2}$
C. 1
D. 2

5 If $xe^y + y = 3$, what is $\frac{dy}{dx}$ at the point $(3, 0)$?

A. $-\frac{1}{4}$
B. $-\frac{1}{3}$
C. $\frac{1}{4}$
D. -1

6 A curve is given by $y + \sin(xy) = 1$. (a) Find $\frac{dy}{dx}$. (b) Find the slope of the curve at the point $(\pi, 1)$.

3.2a / Answer key

Implicit Differentiation: Finding dy/dx

1 (a) $\frac{dy}{dx} = \frac{2x}{3y^2 + 2}$; (b) $\frac{2}{5}$

2 $-\frac{1}{3}$

3 (B)

4 (B)

5 (A)

6 (a) $\frac{dy}{dx} = \frac{-y\cos(xy)}{1 + x\cos(xy)}$; (b) $\frac{1}{1 - \pi}$