Multiple-Choice Test

Chapter 02.01
A Primer on Differentiation

1. The definition of the first derivative of a function $f(x)$ is

(A) $f'(x) = \dfrac{f(x+\Delta x) + f(x)}{\Delta x}$

(B) $f'(x) = \dfrac{f(x+\Delta x) - f(x)}{\Delta x}$

(C) $f'(x) = \lim\limits_{\Delta x \to 0} \dfrac{f(x+\Delta x) + f(x)}{\Delta x}$

(D) $f'(x) = \lim\limits_{\Delta x \to 0} \dfrac{f(x+\Delta x) - f(x)}{\Delta x}$

2. Given $y = 5e^{3x} + \sin x$, $\dfrac{dy}{dx}$ is

(A) $5e^{3x} + \cos x$

(B) $15e^{3x} + \cos x$

(C) $15e^{3x} - \cos x$

(D) $2.666e^{3x} - \cos x$

3. Given $y = \sin 2x$, $\dfrac{dy}{dx}$ at $x = 3$ is most nearly

(A) 0.9600

(B) 0.9945

(C) 1.920

(D) 1.989

4. Given $y = x^3 \ln x$, $\dfrac{dy}{dx}$ is

(A) $3x^2 \ln x$

(B) $3x^2 \ln x + x^2$

(C) x^2

(D) $3x$

5. The velocity of a body as a function of time is given as $v(t) = 5e^{-2t} + 4$, where t is in seconds, and v is in m/s. The acceleration in m/s^2 at $t = 0.6$ s is

(A) -3.012
(B) 5.506
(C) 4.147
(D) -10.00

6. If $x^2 + 2xy = y^2$, then $\frac{dy}{dx}$ is

(A) $\frac{x+y}{y-x}$
(B) $2x + 2y$
(C) $\frac{x+1}{y}$
(D) $-x$

For a complete solution, refer to the links at the end of the book.