

Chapter 5 Review Extra Practice

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1. Determine $\frac{dy}{dx}$ for each of the following.

a. $y = -e^{-x}$

b. $y = e^{x^2}$

c. $y = e^{-5x}$

d. $y = 2xe^{2x}$

e. $y = \frac{e^x}{e^{-x}}$

2. Determine $f'(x)$ for each of the following functions.

a. $f(x) = 6^x$

b. $f(x) = 3^{\sqrt{x}}$

c. $f(x) = (x^3)3^x$

d. $f(x) = \frac{3^x}{x^3}$

3. Determine $\frac{dy}{dx}$ for each of the following.

a. $y = 8 \sin 8x$

b. $y = -\sin x + \frac{1}{4} \cos 4x$

c. $y = \frac{1}{3} \cos^3 x$

d. $y = 2x (\tan x)$

e. $y = \sin^2(e^x)$

f. $y = \tan(2^x)$

4. For the following functions, first determine the x -coordinate of any critical points, if they exist. Then, determine all maximum and minimum values.

a. $f(x) = -2xe^{-x}$

b. $f(x) = xe^{x+2} - 4$

c. $f(x) = -3^x + 5x$

5. For each of the following functions, determine the slope of the tangent to the curve at the point with the given x -coordinate.

a. $f(x) = \tan 5x, x = \pi$

b. $f(x) = 0.5x - 3 \cos x, x = \frac{\pi}{6}$

c. $f(x) = e^{\sin x}, x = 3\pi$

6. Determine the local maximum point and the local minimum point on the curve $y = 4x - \tan x$ in the interval $-\frac{\pi}{2} < x < \frac{\pi}{2}$.

7. Determine $\frac{d^2y}{dx^2}$ for each of the following.

a. $y = 4e^{5x}$

b. $y = \sin(e^{-x})$

c. $y = \tan(2x^2)$

8. Determine y' for each of the following.

a. $y = \cos(7^x)$

b. $y = \tan(5 + x^3)$

c. $y = \frac{\sin x}{e^x}$

9. For each of the following functions, determine an equation for the tangent to the curve at the point with the given x -coordinate.

a. $f(x) = \cos(2x - \pi), x = \frac{\pi}{3}$

b. $f(x) = e^{\cos x}, x = \pi$