

Chapter 5 Review Extra Practice Answers

1. a. $\frac{dy}{dx} = e^{-x}$

b. $\frac{dy}{dx} = 2xe^{x^2}$

c. $\frac{dy}{dx} = -5e^{-5x}$

d. $\frac{dy}{dx} = 2e^{2x}(2x + 1)$

e. $\frac{dy}{dx} = 2e^{2x}$

2. a. $f'(x) = (6^x)\ln 6$

b. $f'(x) = \frac{1}{2\sqrt{x}}(3^{\sqrt{x}})\ln 3$

c. $f'(x) = 3^x(x^3\ln 3 + 3x^2)$

d. $f'(x) = \frac{x(3^x)\ln 3 - 3(3^x)}{x^4}$

3. a. $\frac{dy}{dx} = 64 \cos 8x$

b. $\frac{dy}{dx} = -\cos x - \sin 4x$

c. $\frac{dy}{dx} = -\cos^2 x \sin x$

d. $\frac{dy}{dx} = 2x \sec^2 x + 2 \tan x$

e. $\frac{dy}{dx} = 2e^x \sin(e^x) \cos(e^x)$

f. $\frac{dy}{dx} = \ln 2(2^x) \sec^2(2^x)$

4. a. critical point at $x = 1$; minimum value: -0.74 at $x = 1$

b. critical point at $x = -1$; minimum value: -6.72 at $x = -1$

c. critical point at $x = 1.38$; maximum value: 2.35 at $x = 1.38$

5. a. 5

b. 2

c. -1

6. maximum: $(1.05, 2.46)$; minimum: $(-1.05, -2.46)$

7. a. $\frac{d^2y}{dx^2} = 100e^{5x}$

b. $\frac{d^2y}{dx^2} = -e^{-2x}(\sin(e^{-x})) + e^{-x}(\cos(e^{-x}))$

c. $\frac{d^2y}{dx^2} = 32x^2 \sec^2(2x^2) \tan(2x^2) + 4 \sec^2(2x^2)$

8. a. $-\ln 7(7^x) \sin(7^x)$

b. $3x^2 \sec^2(5 + x^3)$

c. $\frac{\cos x - \sin x}{e^x}$

9. a. $-\sqrt{3}x + y - \left(\frac{1}{2} - \frac{\pi}{3}\right) = 0$

b. $y = \frac{1}{e}$