

Chapter 12 Answers

Section 12.1

- Question 1 1) a. Relative maximum at $(-2, 1)$, relative minimum at $(2, -1)$, b. No absolute maximum, absolute minimum at $(2, -1)$.
 2) a. Relative maximum at $(-2, 0)$ and $(1, 0)$, relative minimum at $(-0.5, -1.2)$, b. Absolute maximum at $(-2, 0)$ and $(1, 0)$, no absolute minimum.
- Question 2 1) Increasing $(-2, 0)$ and $(0, \infty)$, decreasing $(-\infty, -2)$
 2) Increasing $(-\infty, 1)$ and $(1, \infty)$
- Question 3 1) Relative maximum at $(-1, 21)$, relative minimum at $(1.5, -10.25)$
 2) Relative maximum at $(0, 0)$, relative minimum at $(2, 4)$
- Question 4 1) Absolute maximum at $(10, 3022)$, absolute minimum at $(5, -103)$

Section 12.2

- Question 1 1) $\frac{d^2y}{dx^2} = -120x^3 - 2$, 2) $f''(x) = \frac{8}{(x-3)^2}$
- Question 2 1) $\frac{d^3y}{dx^3} = -360x^2$, $\frac{d^4y}{dx^4} = -720x$
 2) $f^{(3)}(x) = -24(x-3)^{-4}$, $f^{(4)}(x) = 96(x-3)^{-5}$
- Question 3 1) Concave up $(-\infty, 1.667)$, Concave down $(1.667, \infty)$
 2) Concave up $(-1, \infty)$, Concave down $(-\infty, -1)$
 3) $-3/2$ is a relative maximum and -1 is a relative minimum
- Question 4 1) Point of diminishing returns is $(40, 6760)$

Section 12.3

- Question 1 1) a. 18.47 hundred units or 1847 units, b. 1547.650 thousand dollars or \$1,547,650.
 2) a. $R(p) = 105p - 0.2p^3$, b. \$13.23, c. 926.01 hundred dollars or \$92601
 3) a. $R(x) = -0.5x^2 + 10x$, b. $P(x) = -0.5x^2 + 8x - 8$, c. 8 hundred units or 800, d. 24 hundred dollars or \$2400.

Question 2 1) a. $\bar{C}(x) = \frac{0.005x^2 + 120}{x}$, b. 154.919 thousand units or 154,919 units

Section 12.4

Question 1 1) Width of $50/3$ by a length of 50 to give an area of $2500/3$

2) a. $R(p) = 1000p - 5(p - 100)p$, b. 150 passengers, c. \$112,500

Question 2 1) Approximately 34,641

2) Approximately 141