

4.5 Absolute Maxima and Minima

4.6 Optimization

Provide an appropriate response.

- 1) Find the absolute maximum and minimum values of $f(x) = 9x^3 - 54x^2 + 81x + 13$ on the interval $[-6, 2]$. 1) _____
 A) $\max f(x) = f(-6) = -4361$ B) $\max f(x) = f(1) = 49$ C) $\max f(x) = f(1) = 4361$
 $\min f(x) = f(1) = 49$ $\min f(x) = f(-6) = -4361$ $\min f(x) = f(-6) = -49$
- 2) Find the absolute minimum value of $f(x) = 4x + x^2 + 2$ on $[0, \infty)$. 2) _____
 A) Absolute minimum is 2 at $x = 2$. B) Absolute minimum is 4 at $x = 2$.
 C) Absolute minimum is 2 at $x = 0$. D) Absolute minimum is 2 at $x = 6$.
- 3) A drug that stimulates reproduction is introduced into a colony of bacteria. After t minutes, the number of bacteria is given approximately by: 3) _____
 $N(t) = 1,000 + 36t^2 - t^3, \quad 0 \leq t \leq 30$
 At what value of t is the number of bacteria a maximum?
 A) 24 min B) 30 min C) 12 min D) 6 min
- 4) Find the relative extrema of the function. List your answer(s) in terms of ordered pair(s). 4) _____
 $f(x) = 5 - x^2$
 A) Relative maximum: $(5, \sqrt{5})$ B) Relative maximum: $(0, 5)$
 C) Relative minimum: $(0, 5)$ D) Relative minima: $(-\sqrt{5}, 0); (\sqrt{5}, 0)$
- 5) Find two numbers whose sum is 360 and whose product is a maximum. 5) _____
 A) 1 and 359 B) 180 and 180 C) 10 and 350 D) 179 and 181

Solve the problem.

- 6) A carpenter is building a rectangular room with a fixed perimeter of 180 ft. What are the dimensions of the largest room that can be built? What is its area? 6) _____
 A) 90 ft by 90 ft; $8,100 \text{ ft}^2$ B) 45 ft by 45 ft; $2,025 \text{ ft}^2$
 C) 45 ft by 135 ft; $6,075 \text{ ft}^2$ D) 18 ft by 162ft; $2,916 \text{ ft}^2$
- 7) The annual revenue and cost functions for a manufacturer of zip drives are approximately 7) _____
 $R(x) = 520x - 0.02x^2$ and $C(x) = 160x + 100,000$, where x denotes the number of drives made. What is the maximum annual profit?
 A) \$1,820,000 B) \$1,520,000 C) \$1,620,000 D) \$1,720,000
- 8) A company manufactures and sells x pocket calculators per week. If the weekly cost and demand equations are given by: 8) _____
 $C(x) = 8,000 + 5x$
 $p = 14 - \frac{x}{4,000}, \quad 0 \leq x \leq 25,000$
 Find the production level that maximizes profit.
 A) 14,000 pocket calculators per week B) 8000 pocket calculators per week
 C) 2000 pocket calculators per week D) 18,000 pocket calculators per week

Answer Key

Testname: PRACTICE05

- 1) B
- 2) C
- 3) A
- 4) B
- 5) B
- 6) B
- 7) B
- 8) D