

Chapter 4 Practice Test

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem analytically.

- 1) Of all numbers whose sum is 140, find the two that have the maximum product. That is, maximize $Q = xy$, where $x + y = 140$. 1) _____
- 2) Of all numbers whose difference is 18, find the two that have the minimum product. 2) _____

Solve the problem.

- 3) Find the dimensions that produce the maximum floor area for a one-story house that is rectangular in shape and has a perimeter of 121 ft. Round to the nearest hundredth, if necessary. 3) _____
- 4) From a thin piece of cardboard 20 in. by 20 in., square corners are cut out so that the sides can be folded up to make a box. What dimensions will yield a box of maximum volume? What is the maximum volume? Round to the nearest tenth, if necessary. 4) _____
- 5) If the price charged for a bolt is p cents, then x thousand bolts will be sold in a certain hardware store, where $p = 42 - \frac{x}{18}$. How many bolts must be sold to maximize revenue? 5) _____
- 6) Find the number of units that must be produced and sold in order to yield the maximum profit, given the following equations for revenue and cost:
 $R(x) = 7x$
 $C(x) = 0.001x^2 + 0.9x + 20$. 6) _____
- 7) A spherical balloon is inflated with helium at a rate of 110π ft³/min. How fast is the balloon's radius increasing when the radius is 4 ft? 7) _____
- 8) The radius of a right circular cylinder is increasing at the rate of 6 in./s, while the height is decreasing at the rate of 3 in./s. At what rate is the volume of the cylinder changing when the radius is 5 in. and the height is 11 in.? 8) _____
- 9) A man flies a kite at a height of 120 m. The wind carries the kite horizontally away from him at a rate of 8 m/sec. How fast is the distance between the man and the kite changing when the kite is 130 m away from him? 9) _____
- 10) A ladder is slipping down a vertical wall. If the ladder is 20 ft long and the top of it is slipping at the constant rate of 2 ft/s, how fast is the bottom of the ladder moving along the ground when the bottom is 16 ft from the wall? 10) _____

Answer Key

Testname: CHAPTER 4 CALCULUS PRACTICE TEST

- 1) 70 and 70
- 2) 9 and -9
- 3) 30.25 ft × 30.25 ft
- 4) 13.3 in. × 13.3 in. × 3.3 in.; 592.6 in.³
- 5) 378 thousand bolts
- 6) 3050 units
- 7) 1.72 ft/min
- 8) 585π in.³/s
- 9) 3.1 m/sec
- 10) 1.5 ft/s