

Optimization Problems 1

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

- 1) The velocity of a particle, in feet per second, is given by $v = t^2 - 2t + 7$, where t is the time (in seconds) for which it has traveled. Find the time at which the velocity is at a minimum. 1) _____
A) 3.5 sec B) 2 sec C) 1 sec D) 7 sec
- 2) The velocity of a particle, in feet per second, is given by $v = t^2 - 6t + 5$, where t is the time (in seconds) for which it has traveled. Find the time at which the velocity is at a minimum. 2) _____
A) 6 sec B) 3 sec C) 2.5 sec D) 5 sec
- 3) A carpenter is building a rectangular room with a fixed perimeter of 100 feet. What are the dimensions of the largest room that can be built? What is its area? 3) _____
A) 25 ft by 25 ft; 625 ft^2 B) 25 ft by 75 ft; 1875 ft^2
C) 10 ft by 90 ft; 900 ft^2 D) 50 ft by 50 ft; 2500 ft^2
- 4) A piece of molding 168 centimeters long is to be cut to form a rectangular picture frame. What dimensions will enclose the largest area? Round to the nearest hundredth, if necessary. 4) _____
A) 33.6 cm by 33.6 cm B) 42 cm by 42 cm
C) 12.96 cm by 42 cm D) 12.96 cm by 12.96 cm
- 5) A rectangular field is to be enclosed on four sides with a fence. Fencing costs \$2 per foot for two opposite sides, and \$6 per foot for the other two sides. Find the dimensions of the field of area 670 ft^2 that would be the cheapest to enclose. 5) _____
A) 44.8 ft @ \$2 by 14.9 ft @ \$6 B) 14.9 ft @ \$2 by 44.8 ft @ \$6
C) 8.6 ft @ \$2 by 77.7 ft @ \$6 D) 77.7 ft @ \$2 by 8.6 ft @ \$6
- 6) A rectangular field is to be enclosed on four sides with a fence. Fencing costs \$5 per foot for two opposite sides, and \$2 per foot for the other two sides. Find the dimensions of the field of area 850 square feet that would be the cheapest to enclose. 6) _____
A) 46.1 ft at \$5 by 18.4 ft at \$2 B) 72.9 ft at \$5 by 11.7 ft at \$2
C) 18.4 ft at \$5 by 46.1 ft at \$2 D) 11.7 ft at \$5 by 72.9 ft at \$2
- 7) From a thin piece of cardboard 30 inches by 30 inches, 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. 7) _____
A) 10 in. by 10 in. by 10 in.; 1000 in.^3 B) 20 in. by 20 in. by 5 in.; 2000 in.^3
C) 20 in. by 20 in. by 10 in.; 4000 in.^3 D) 15 in. by 15 in. by 7.5 in.; 1687.5 in.^3
- 8) From a thin piece of cardboard 10 inches by 10 inches, 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. 8) _____
A) 6.7 in. by 6.7 in. by 3.3 in.; 148.1 in.^3 B) 3.3 in. by 3.3 in. by 3.3 in.; 37 in.^3
C) 5 in. by 5 in. by 2.5 in.; 62.5 in.^3 D) 6.7 in. by 6.7 in. by 1.7 in.; 74.1 in.^3

Answer Key

Testname: OPTIMIZATION PROBLEMS 1

- 1) C
- 2) B
- 3) A
- 4) B
- 5) A
- 6) C
- 7) B
- 8) D
- 9) D
- 10) B
- 11) D
- 12) C