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

Solve the problem.

| dimensions of the largest room that can be | n with a fixed perimeter of 100 feet. What are the e built? What is its area? | 1) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| A) 10 ft by 90 ft; 900 ft ² | B) 25 ft by 25 ft; 625 ft ² | |
| C) 50 ft by 50 ft; 2500 ft ² | D) 25 ft by 75 ft; 1875 ft ² | |
| 2) A carpenter is building a rectangular room dimensions of the largest room that can be | n with a fixed perimeter of 400 feet. What are the e built? What is its area? | 2) |
| A) 100 ft by 100 ft; 10,000 ft ² | B) 100 ft by 300 ft; 30,000 ft ² | |
| C) 200 ft by 200 ft; 40,000 ft ² | D) 40 ft by 360 ft; 14,400 ft ² | |
| 2) Ensure a thin mines of south and 20 in the 1 | | 2) |
| 3) From a thin piece of cardboard 30 inches by sides can be folded up to make a box. Why What is the maximum volume? Round to A) 10 in. by 10 in. by 10 in.; 1000 in.³ | by 30 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? The nearest tenth, if necessary. B) 20 in. by 20 in. by 10 in.; 4000 in. ³ | 3) |
| 3) From a thin piece of cardboard 30 inches by sides can be folded up to make a box. Why What is the maximum volume? Round to A) 10 in. by 10 in. by 10 in.; 1000 in.³ C) 20 in. by 20 in. by 5 in.; 2000 in.³ | by 30 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? The nearest tenth, if necessary. B) 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 | 3) |
| 3) From a thin piece of cardboard 30 inches be sides can be folded up to make a box. Whe What is the maximum volume? Round to A) 10 in. by 10 in. by 10 in.; 1000 in.³ C) 20 in. by 20 in. by 5 in.; 2000 in.³ 4) From a thin piece of cardboard 10 inches be sides can be folded up to make a box. Whe What is the maximum volume? Round to the maxim | by 30 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? b the nearest tenth, if necessary. B) 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 by 10 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? the nearest tenth, if necessary. | 3) |
| 3) From a thin piece of cardboard 30 inches be sides can be folded up to make a box. Whe What is the maximum volume? Round to A) 10 in. by 10 in. by 10 in.; 1000 in.³ C) 20 in. by 20 in. by 5 in.; 2000 in.³ 4) From a thin piece of cardboard 10 inches be sides can be folded up to make a box. Whe What is the maximum volume? Round to A) 6.7 in. by 6.7 in. by 3.3 in.; 148.1 in. | by 30 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? b the nearest tenth, if necessary. B) 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 by 10 inches, square corners are cut out so that the nat dimensions will yield a box of maximum volume? b the nearest tenth, if necessary. B) 3.3 in. by 3.3 in. by 3.3 in.; 37 in. ³ | 3) |

5) A farmer decides to make three identical pens with 88 feet of fence. The pens will be next to each 5) _ other sharing a fence and will be up against a barn. The barn side needs no fence.



What dimensions for the total enclosure (rectangle including all pens) will make the area as large as possible?

| A) 14.67 ft by 73.33 ft | B) 11 ft by 44 ft |
|-------------------------|-------------------|
| C) 11 ft by 11 ft | D) 22 ft by 22 ft |

6) A farmer decides to make three identical pens with 136 feet of fence. The pens will be next to each other sharing a fence and will be up against a barn. The barn side needs no fence. BARN PENS What dimensions for the total enclosure (rectangle including all pens) will make the area as large as possible? A) 34 ft by 34 ft B) 17 ft by 17 ft D) 17 ft by 68 ft C) 22.67 ft by 113.33 ft 7) Find the number of units that must be produced and sold in order to yield the maximum profit, 7) given the following equations for revenue and cost: $R(x) = 50x - 0.5x^2$ C(x) = 4x + 3.A) 47 units C) 54 units D) 46 units B) 49 units 8) Find the number of units that must be produced and sold in order to yield the maximum profit, 8) given the following equations for revenue and cost: R(x) = 5x $C(x) = 0.001x^2 + 1.3x + 30.$ A) 3700 units B) 3150 units C) 1850 units D) 6300 units 9) If the price charged for a bolt is p cents, then x thousand bolts will be sold in a certain hardware 9) store, where $p = 130 - \frac{x}{24}$. How many bolts must be sold to maximize revenue? A) 1560 bolts B) 3120 thousand bolts C) 1560 thousand bolts D) 3120 bolts 10) ____ 10) The price P of a certain computer system decreases immediately after its introduction and then increases. If the price P is estimated by the formula $P = 170t^2 - 1700t + 6400$, where t is the time in months from its introduction, find the time until the minimum price is reached. A) 5 months B) 10 months C) 20 months D) 8.5 months 11) The price P of a certain computer system decreases immediately after its introduction and then 11) increases. If the price P is estimated by the formula $P = 190t^2 - 2100t + 6400$, where t is the time in months from its introduction, find the time until the minimum price is reached. A) 5.5 months B) 11.1 months C) 10.5 months D) 22.1 months

6)

- 13) A private shipping company will accept a box for domestic shipment only if the sum of its
 13) ______
 length and girth (distance around) does not exceed 114 inches. What dimensions will give a box
 with a square end the largest possible volume?



A) 19 in. by 38 in. by 38 in.C) 19 in. by 19 in. by 38 in.

B) 38 in. by 38 in. by 38 in.D) 19 in. by 19 in. by 95 in.

14)

15)

14) A rectangular sheet of perimeter 27 centimeters and dimensions x centimeters by y centimeters is to be rolled into a cylinder as shown in the figure. What values of x and y give the largest volume?



- 15) If the price charged for a candy bar is p(x) cents, then x thousand candy bars will be sold in a certain city, where $p(x) = 113 \frac{x}{14}$. How many candy bars must be sold to maximize revenue?
 - A) 1582 candy barsB)C) 1582 thousand candy barsD)

B) 791 candy bars

D) 791 thousand candy bars

Answer Key Testname: OPTIMIZATION PROBLEMS

1) B 2) A 3) C 4) D 5) B 6) D 7) D 8) C 9) C 10) A 11) A 12) B 13) C

14) B 15) D