

Name: _____

Date: _____ Period: _____

Optimization Review Sheet

Calculus Honors

Optimization Review Sheet

Complete the following questions below.

- 1.) Find two positive numbers that satisfy the given requirements. The product is 192 and the sum is a minimum.
- 2.) Find two positive numbers that satisfy the given requirements. The product is 192 and the sum of the first plus three times the second is a minimum.
- 3.) Find two positive numbers that satisfy the given requirements. The sum of the first number squared and the second is 27 and the product is a maximum.
- 4.) Emily has a rectangular garden that she wants to fence. If she has 100 linear feet of fencing, what are the dimensions that will maximize the area?
- 5.) Chad wants to fence in his vegetable garden. In order to produce the vegetables that he wants, he needs the garden to be 64 square feet. What should the dimensions of his garden be, if he wants to buy the least amount of fencing?
- 6.) Jack became a rancher! He has 630 feet of fencing to enclose two adjacent rectangular corrals. What dimensions should be used so that the enclosed area will be a maximum? Round your answer to the nearest hundredth of a foot, if necessary.
- 7.) Determine the dimensions of a rectangular solid (with a square base) with a maximum volume its surface area is 445 square centimeters. Round your answer to the nearest tenth, if necessary.
- 8.) A rectangular page is to contain 30 square inches of print. The margins on each side are 1 inch. Find the dimensions of the page such that the least amount of paper is used. Round to the nearest hundredth, if necessary.
- 9.) A poster is to contain 100 square inches of picture surrounded by a 4-inch margin at the top and bottom and a 2-inch margin on each side. Find the overall dimensions that will minimize that total area of the poster.
- 10.) A rectangular field, bounded on one side by a building, is to be fenced in on the other three sides. If 3,000 feet of fence is to be used, find the dimensions of the largest field that can be fenced in.
- 11.) An open-top box with a square bottom and rectangular sides is to have a volume of 256 cubic inches. Find the dimensions that require the minimum amount of material.

- 12.) A 384 square meter plot of land is to be enclosed by a fence and divided into two equal parts by another fence parallel to one pair of sides. What dimensions of the outer rectangle will minimize the amount of fence used? Round to the nearest hundredth.
- 13.) What is the radius of a cylindrical soda can with volume of 512 cubic inches that will use the minimum material? Round to the nearest tenth, if necessary.
- 14.) What is the radius of a cylindrical soda can with a volume of 266 cubic inches that will use the minimum material? Round to the nearest hundredth.
- 15.) A printed page of a total area 480 cm^2 has top and side margins of 2 cm and a bottom margin of 3 cm. Find the dimensions of the page that make the *area of print* a maximum. Round to the nearest tenth.
- 16.) Tyler became a farmer! He has 540 feet of fencing to enclose two adjacent rectangular corrals. What dimensions should be used so that the enclosed area will be a maximum? Round your answer to the nearest hundredth of a foot, if necessary.
- 17.) A rectangular field, bounded on one side by a river, is to be fenced in on the other three sides. If 3,600 feet of fence is to be used, find the dimensions of the largest field that can be fenced in. Round to the nearest tenth, if necessary.
- 18.) An open-top box with a square bottom and rectangular sides is to have a volume of 444 cubic inches. Find the dimensions that require the minimum amount of material. Round to the nearest thousandth.
- 19.) A poster is to contain 300 square inches of picture surrounded by a 2-inch margin at the top and sides and the bottom has a 3 inch margin. Find the overall dimensions that will minimize that total area of the poster. Round to the nearest tenth of an inch.
- 20.) Nicole decided she wants to become a farmer. She plans to fence a rectangular pasture adjacent to a river. The pasture must contain 270,000 square meters in order to provide enough grass for the herd. What dimensions would require the least amount of fencing if no fencing is needed along the river. Round to the nearest thousandth, if necessary.

Answer Key:

- 1.) 13.856 & 13.856
- 2.) 8 & 24
- 3.) 3 & 18
- 4.) 25 ft by 25 ft
- 5.) 8 ft by 8 ft
- 6.) 157.5 ft by 105 ft
- 7.) 8.6 cm by 8.6 cm by 8.6 cm
- 8.) 7.48 in by 7.47 in
- 9.) 11.071 *in* by 22.142 *in*
- 10.) 750 ft by 1500 ft
- 11.) 8 in by 8 in by 4 in
- 12.) 24m by 16m
- 13.) 4.3 in
- 14.) 3.49 in
- 15.) 19.6 cm by 24.5 cm
- 16.) 135 ft by 90 ft
- 17.) 900 ft by 1800 ft
- 18.) 9.612 in by 9.612 in by 4.806 in
- 19.) 19.5 in by 24.4 in
- 20.) 367.423 m by 734.848 m