Worksheet 12

Math 251, Summer 2017

Name: _____

I have given you the answers to these problems on the bottom of the last page. You need to make sure you know how to get these answers.

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1. The sum of two positive numbers is 16. What is the smallest value of the sum of their squares? Prove that your answer is a minimum.

2. Find two numbers whose difference is 100 and whose product is a minimum. Prove that it is indeed a minimum.

3. A box with a square base and open top (meaning no lid) must have a volume of 32,000 cm^3. Find the dimensions of the box that minimize the amount of material used.

4. A cylindrical can without a top needs to be designed to hold 2000 cm^3 of liquid. Find the dimensions that will minimize the cost to make such a can.

5. A piece of wire 10 m long is cut into two pieces. One piece is bent into a square, and the other is bent into an equilateral triangle. How should the wire be cut so that the total area enclosed by both figures is (a) minimum? (b) maximum?

Answers: 1) 128. 2) 50 and -50. 3) $40 \times 40 \times 20$. 4) $r = 8.6$cm, $h = 8.6$cm. 5a) Cut piece to be 4.35m b) cut one piece to be 6.25m.