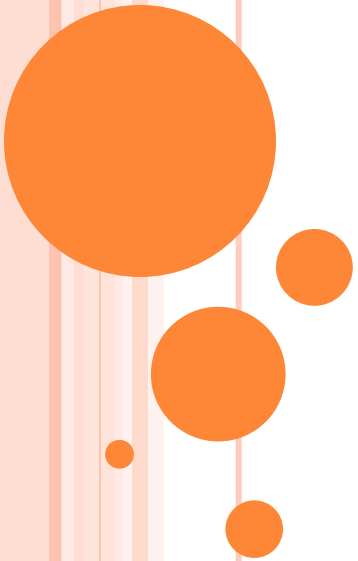


Section 4.7 Optimization

- An open top box is to be made by cutting congruent squares from the corners of an 18 x 12 inch sheet of paper and bending up the sides.
- What dimensions give the box the largest volume?
- Let's build some boxes!

- How can we answer this question without building the boxes?

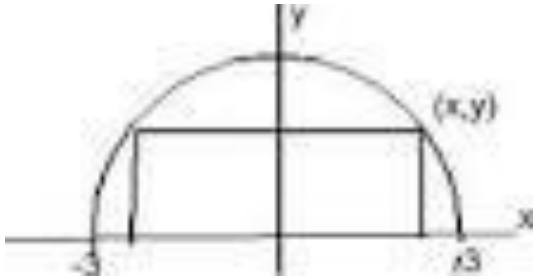
Steps For Optimization Problems

- 1. Draw and label a picture.
- 2. Decide what you want to optimize.
- 3. Write an equation to represent this.
- 4. Write down any other facts. (Constraints, other equations)
- 5. Get optimization equation in terms of one variable.
- 6. Take the first derivative and set it equal to zero to find critical numbers.
- 7. Verify if critical number is a max or min with sign chart or 2^{nd} derivative.
- 8. Answer question using complete sentence.

- An open top box is to be made by cutting congruent squares from the corners of an 18 by 12 inch sheet of paper and bending up the sides. What dimensions give the box the largest volume?

- Trevor has 2400 ft of fencing and wants to fence off a rectangular field that borders a straight river. He needs no fencing along the river. What are the dimensions of the field that has the largest area?

- Malcom is designing a cylindrical can to hold 1liter (or 1000 cubic centimeters) of oil. Find the dimensions of the can that will minimize the cost to manufacture the can.



- Izzy wants to calculate the dimensions of the rectangle with maximum area that can be inscribed in a semicircle with diameter of 6 units.

Day 2 Example

- If 40 passengers hire a special car on a train, they will be charged $8 each. This fare will be reduced by $0.10 per extra person over the maximum number of 40. What number of passengers will produce the max profit for the railroad?