3.7 More Examples

Name: Block: Seat:

Optimization problems

Solving Minimum and Maximum Problems (p.220):

1. Make a sketch, identify ______________
2. Find the Primary equation, this is what you will minimize or maximize. This may depend on two variables
3. Find the Secondary equation that allows you to make the Primary Equation all about one varioable
4. Consider the domain in the context of the problem
5. Justify minimums and maximums using the EVT, 1^{st} derivative test, or the 2^{nd} derivative test.
6. Remember to answer the question using the units and context of the problem

1. Find the maximum product possible by multiplying two positive numbers whose sum is 300.
   (a) Primary Question:

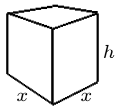
   (b) Secondary Equation:

   (c) Function to optimize:

   (d) Find extreme

   (e) Conclusion

2. You want to construct a box whose base is a square and that has a volume of 36 cubic feet. The material to build the top and bottom cost eight dollars per square foot and the material used to build the signs costs six dollars per square foot. Determine the dimensions that will minimize the cost to build the box.



(a) Primary Question:

(b) Secondary Equation:

(c) Function to optimize:

(d) Find extreme

(e) Conclusion

3. A rectangular area is to be closed by a wall on one side and fencing on the other three sides if 18 m of fencing are used, what is the maximum area that can be enclosed?
   (a) Primary Question:

   (b) Secondary Equation:

   (c) Function to optimize:

   (d) Find extreme

   (e) Conclusion

4. a rectangle has its upper two vertices on the graph of $y = 12 - \dfrac{x^2}{3}$ and it's lower two vertices on the x-axis. What is the maximum possible area of the rectangle?

   (a) Primary Question:

   (b) Secondary Equation:

   (c) Function to optimize:

   (d) Find extreme

   (e) Conclusion

5. The volume of a cylindrical tin can with a top and bottom is to be 16π cubic inches. If a minimum amount of tin is to be used to construct the can, what must be the height of the can?

   (a) Primary Question:

   (b) Secondary Equation:

   (c) Function to optimize:

   (d) Find extreme

   (e) Conclusion