Math 1231: Single-Variable Calculus I
George Washington University Fall 2026
Recitation 10

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Problem 1. If we have 1200 cm^2 of cardboard to make a box with a square base and an open top, what is the largest possible volume of the box?

(a) What are we trying to do? What is our objective function?

(b) What constraints are we acting under?

(c) Use our constraints to get a single-variable function to optimize.

(d) Find the optimum value.

(e) How do we know this is really the largest possible asnwer?

Problem 2. A pizzeria sells pizzas for \$10 per pizza, and it costs $2x + x^2$ cents to make x pizzas. How many pizzas should the pizzeria make to maximize profit, and how much profit will it make?

(a) What is your objective function?

(b) Is there a constraint here? What?

(c) Make a single-variable function and find the critical points.

(d) Answer the question. How do we know when we have a maximum or minimum?

Problem 3. A piece of wire 10 m long is going to be cut into two pieces. We will fold one piece into a square and the other into an equilateral triangle. What is the largest joint area we can enclose? What is the smallest?

(a) What is your objective function? Do you need one objective function, or two?

(b) What constraint are you operating under?

(c) Make a single-variable function and find the critical points.

(d) Answer the questions. How do we know when we have a maximum or minimum?