

Problem Set 10 — Optimization

Complete by **Thursday, November 7**

Grade by **Tuesday, November 12**

Purpose

This problem set reinforces your understanding of how to use derivatives to solve optimization problems. By the time you finish this problem set you should be able to ...

- Use derivatives to solve optimization problems
- Find derivatives
- Solve linear and quadratic equations.

Background

This problem set is based on material from section 4.7 of our textbook. We discussed this material in class between October 30 and November 1.

Activity

Solve the following problems:

Question 1. (Based on exercise 318 in section 4.7 of OpenStax *Calculus, Volume 1 for SUNY Geneseo*.)

Suppose x and y are positive integers whose sum is 10. Find the values of x and y that minimize the sum of their squares. Then find the values of x and y that maximize the sum of their squares.

Question 2. (Exercise 341 in Section 4.7 of OpenStax *Calculus, Volume 1 for SUNY Geneseo*.)

Find the largest-volume right circular cylinder that fits inside a sphere of radius 1. Start by drawing a diagram of the situation.

Question 3. (Exercise 322 in Section 4.7 of OpenStax *Calculus, Volume 1 for SUNY Geneseo*.)

Two poles are connected by a wire that is also connected to the ground. The first pole is 20 ft tall and the second pole is 10 ft tall. There is a distance of 30 ft between the two poles. Figure out where the wire should be anchored to the ground in order to minimize the amount of wire needed. See the textbook for a diagram of this situation.

Follow-Up

I will grade this exercise in a face-to-face meeting with you. During this meeting I will look at your solution, ask you any questions I have about it, answer questions you have, etc. Please bring a written solution to the exercise to your meeting, as that will speed the process along.

Sign up for a meeting via Google calendar. Please make the meeting 15 minutes long, and schedule it to finish before the end of the “Grade By” date above.