MATH 223 Spring 2025
Assignment 5
Due: Friday, February 21

Reading

Read carefully Sections 3.3 "Partial Derivatives" in our text *Multivariable Calculus: A Linear Algebra Based Approach.*

Writing

Write out careful and complete solutions of Exercises 45, 51 in Chapter 2, Exercises 4, 6 in Chapter 3, and Problem A below.
Optional Extra Credit Problem: Exercise 50 in Chapter 2. You may submit a solution at any time before the end of classes.

Problem A: In World War I, Germany bombarded Paris by guns from the unprecedented distance of 75 miles away, shells taking 186 seconds to complete their trajectories. Estimate the angle of elevation at which the gun (called *Big Bertha*) was fired and the maximum height of the trajectory, assuming negligible air resistance. (During a substantial part of the trajectory the altitude was high enough that air resistance was negligible there).
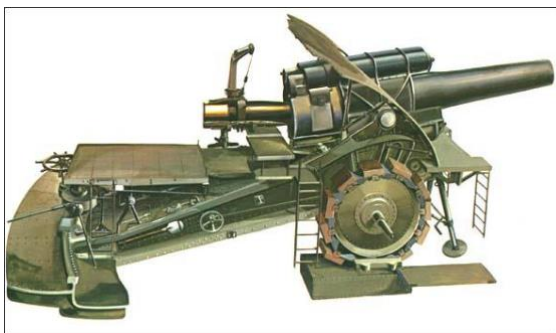
Some Hints and Solutions

45: Roughly 118.6 ft/sec.

51: About d =230.4 ft. Stone reaches water in $\sqrt{d}/4$ seconds; sound takes $d/1125$ seconds to get from water back to top of well.

4: *M* is not invertible along some particular surface in 3-space whose equation you should be able to find.

A: Angle is inverse tangent of 2976/2129 and maximum height is about 26.2 miles.