3.7 Videos Guide

3.7a

Exercises:

- What is the minimum vertical distance between the parabolas $y = x^2 + 1$ and $y = x - x^2$?

3.7b

- Find the point on the curve $y = \sqrt{x}$ that is closest to the point $(3, 0)$.
- Consider the following problem: A box with an open top is to be constructed from a square piece of cardboard, 3 ft wide, by cutting out a square from each of the four corners and bending up the sides. Find the largest volume that such a box can have.

3.7c

- A rectangular storage container with an open top is to have a volume of 10 m^3. The length of its base is twice the width. Material for the base costs \$10 per square meter. Material for the sides costs \$6 per square meter. Find the cost of materials for the cheapest such container.

3.7d

- A right circular cylinder is inscribed in a cone with height h and base radius r. Find the largest possible volume of such a cylinder.

3.7e

- Find the area of the largest rectangle that can be inscribed in the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

3.7f

- A fence 8 ft tall runs parallel to a tall building at a distance of 4 ft from the building. What is the length of the shortest ladder that will reach from the ground over the fence to the wall of the building?