

Solve each of the following problems. Show your work and your solutions neatly organized on separate work paper.

1. Find the least and the greatest straight line distance between the ellipse $4x^2 + 9y^2 = 36$ and the point $(4, 0)$.
2. A messenger is to go ashore from a ship that is 10 miles offshore and deliver a message to a camp that is 4 miles up the beach from the point nearest the ship. He can go 12 mph by boat and will be met by a jeep that can go 30 mph over the beach. Where should he land to complete the trip in as short a time as possible?
3. A 27 foot wall is 8 feet from the side of a building. Find the length of the shortest ladder that will reach the building from the ground outside the wall.
4. A 27 foot girder has to be moved down a corridor that is 8 feet wide and around a right angle turn into another corridor. What is the minimum width of the second corridor? (Ignore the width of the girder.)