

1. (from a recent semester's second midterm) Find the area of the largest rectangle that can be inscribed in a semicircle of radius 3.
2. Louise can swim 3 mph and run 8 mph. She is standing on one bank of a river that is 300 ft wide and wants to reach a point located 200 ft downstream on the other side as quickly as possible. She will swim diagonally across the river and the jog along the river bank. Find the best route for Louise to take.
3. Matt is making Halloween decorations. He wants to bend a square and an circle out of a piece of wire 20 inches long (they are minimalist Halloween decorations). Where should he cut the wire if he wants to minimize the area of the two shapes? What if he wants to maximize the combined area?
4. A six-foot-wide hallway meets a 3-foot-wide hallway at a right angle. What is the length of the longest ladder that can be carried horizontally around the corner?