

1. Find two numbers whose difference is 100 and whose product is a minimum.
2. Find the point on the line $6x + y = 9$ that is closest to the origin. Hint: minimizing distance is equivalent to minimizing distance squared!

3. A stadium curve is the curve that bounds a rectangular region with half circles at opposite ends of the rectangle; think of a running track. Find the dimensions of a stadium curve that maximize the area of the enclosed rectangle if the perimeter of the stadium curve is 440 yards.

4. A hiker is on the tundra two miles south of a road. The road runs east-west the hiker wishes to reach a point on the road 5 miles to the east. The hiker can travel at 3 mph on the tundra and 4 mph on the road. What path should the hiker take to minimize their travel time to their destination?

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