OPTIMIZATION PROBLEMS INVOLVING
COMPOSITE FUNCTION MODELS

Example 1   Minimizing a Distance

Which points on the graph of $y = 9 - x^2$ are closest to point $(0, 6)$?

Example 2   Deciding When Two Moving Objects Are Closest to Each Other

A north–south highway intersects an east–west highway at point P. A vehicle crosses P at 1:00 p.m., travelling east at a constant speed of 60 km/h. At the same instant, another vehicle is 5 km north of P, travelling south at 80 km/h. Find the time when the two vehicles are closest to each other and the distance between them at that time.

Example 3   Minimizing the Cost of an Electrical Power Line

George wants to run a power line to a new cottage being built on an island that is 400 m from the shore of a lake. The main power line ends 3 km away from the point on the shore that is closest to the island. The cost of laying the power line under water is twice the cost of laying the power line on land. How should George place the line to minimize the overall cost?