

Practice Quiz 1/27

Solve each optimization problem.

- 1) A geometry student wants to draw a rectangle inscribed in a semicircle of radius 6. If one side must be on the semicircle's diameter, what is the area of the largest rectangle that the student can draw?
- 2) Engineers are designing a box-shaped aquarium with a square bottom and an open top. The aquarium must hold 108 ft^3 of water. What dimensions should they use to create an acceptable aquarium with the least amount of glass?
- 3) Which points on the graph of $y = 5 - x^2$ are closest to the point $(0, 4)$?

Solve each related rate problem.

- 4) Water slowly evaporates from a circular shaped puddle. The radius of the puddle decreases at a rate of 5 in/hr. Assuming the puddle retains its circular shape, at what rate is the area of the puddle changing when the radius is 3 in?
- 5) A conical paper cup is 20 cm tall with a radius of 10 cm. The bottom of the cup is punctured so that the water level goes down at a rate of 3 cm/sec. At what rate is the volume of water in the cup changing when the water level is 6 cm?