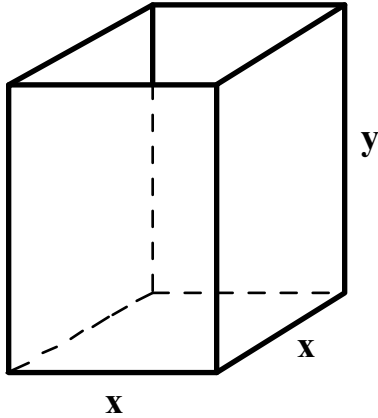


Calculus Worksheet #7 Unit 2 Selected Solutions

Solve the following problems. Show your work neatly organized in the space provided. Express irrational solutions rounded to three significant digits.

1. Find the dimensions of the largest rectangular box with a square base and no top that can be made from 675 square inches of material.



$$V = x^2y$$
$$4xy + x^2 = 675 \longrightarrow y = \frac{675 - x^2}{4x}$$

$$V = f(x) = 168.75x - .25x^3$$

$$f'(x) = 168.75 - .75x^2$$

$$168.75 - .75x^2 = 0$$

$$x^2 = 225$$

$$x = 15 \text{ or } x = \cancel{15}$$

$$y = 7.5$$

Note

$$f''(x) = -1.5x$$

$$f''(15) < 0$$

Therefore, $f(15)$ is a maximum volume.

The box should be 15 inches wide, 15 inches long, and 7.5 inches tall.