Quiz Week 3
Math 102, Spring 2009

Name:

1. Find the area in the region bounded by \( y = 3x \) and \( y = x^2 \) with \( x \geq 0 \). First draw a sketch of the region.

\[
\text{Area} = \int_0^3 3x - x^2 \, dx = \left[ \frac{3x^2}{2} - \frac{x^3}{3} \right]_0^3 = \left( \frac{3}{2} (9) - \frac{27}{3} \right) - 0 \\
= \frac{27}{2} - 9 = 13.5 - 9 = 4.5
\]

2. Let \( f(t) \) represent the rate of flow of water into a bathtub in units of gallons per minute. What does \( \int_2^7 f(t) \, dt \) represent? What are the units for this quantity?

\( \int_2^7 f(t) \, dt = \text{amount of water that flows into bathtub between } t = 2 \text{ minutes and } t = 7 \text{ minutes in gallons.} \)