

**MATH 166**  
**SUMMER 2012**  
**QUIZ 3**

1. Suppose that you have an object and you know that the cross-sectional area at a height of  $x$  units above the base is proportional to  $x^2$  (say that the cross-sectional area is  $cx^2$ ).
  - a) (5 pt) If the object is  $h$  units tall, find an integral that will determine the volume of the object.
  - b) (5 pt) If the volume of the object is  $c^4$ , how tall is the object (in terms of  $c$ )?
  
2. Consider the region bounded by the upper half of the circle  $x^2 + y^2 = R^2$ ,  $R > 0$  and the  $x$ -axis.
  - a) (5 pt) Find the volume obtained when the region above is revolved about the line  $y = -a^2$ .
  - b) (5 pt) What happens to your answer if  $a = 0$ ? Does this make sense?