

Present neatly on separate paper. Justify for full credit. No Calculators.  
Name \_\_\_\_\_ Score \_\_\_\_\_ 10 minutes **Weight: x1**

1)

A solid has a circular base of radius 3. If every plane cross section perpendicular to the  $x$ -axis is an equilateral triangle, then its volume is \_\_\_\_\_.

2)

$$\frac{d}{dx} \int_x^0 \frac{du}{1+u^2} =$$

3)

At each point  $(x, y)$  on a certain curve, the slope of the curve is  $4xy$ . If the curve contains the point  $(0, 4)$ , then its equation is \_\_\_\_\_.

4)

A particle with velocity at any time  $t$  given by  $v(t) = 2e^{2t}$  moves in a straight line. How far does the particle travel during the time interval when its velocity increases from 2 to 4?

5)

$$\int_1^3 \frac{x}{x^2 + 1} dx =$$