

1. Find parametric equations for the line tangent to the curve given by  $x(t) = 3t \cos(2t)$ ,  $y(t) = 2 \sin(2t)$  when  $t = \frac{\pi}{2}$ . (3 points)

2. The integral  $\int_0^5 \pi(2 - \frac{2h}{5})^2 dh$  represents the volume of either a hemisphere or a cone. Which is it? What are the dimension(s) of the volume? Sketch one slice that would be used to calculate the volume, showing how the dimension(s) are related to the slice. (3 points)

3. Suppose that the cornerstone for a grand edifice celebrating the joy of calculus is cut in the shape shown to the right. As shown, the left side of the cornerstone is described by the equation  $x = 1.333(y - 8.75)^2 - 114.083$  (which is the same as  $x = 1.333y^2 - 23.3275y - 12.0252$ ), and the right side by  $y = 18 - \frac{3}{4}x$ . Find the volume of the cornerstone. (4 points)

