

PRINT Your Name: \_\_\_\_\_

Quiz 6 — October 7, 2013 — Section 2 — 4:40 — 5:30

Remove everything from your desk except a pencil or pen.

**Circle** your answer. **Show your work.** Your work should be correct and coherent. **Draw** a meaningful picture.

The quiz is worth 5 points.

Consider a solid  $S$ . The base of  $S$  is an elliptical region with boundary curve  $9x^2 + 4y^2 = 36$ . Cross-sections of  $S$  perpendicular to the  $x$ -axis are isosceles right triangles with hypotenuse in the base. Find the volume of  $S$ .

Chop the  $x$ -axis from  $x = -2$  to  $x = 2$ . The slice with  $x$ -coordinate  $x$  is a triangle with thickness  $t$

of vol  $\frac{1}{2} b h t$  with  $t = dx, b = 2\sqrt{9 - \frac{9x^2}{4}}$

Draw a better picture to calculate  $h$



so  $h = \frac{b}{2}$

the vol of the slice is  $\frac{1}{2} b \frac{b}{2} t = \frac{1}{4} (9 - \frac{9x^2}{4}) dx = 9 (1 - \frac{x^2}{4})$

The vol of the solid is  $9 \int_{-2}^2 (1 - \frac{x^2}{4}) dx = 9 \left[ x - \frac{x^3}{12} \right]_{-2}^2$   
 $= 9 \left( 2 - \frac{8}{12} \right) (2) = 9 \left( 2 - \frac{2}{3} \right) = 9 \left( \frac{4}{3} \right) = 12$