

# Spring 2009 Math 152

## Week in Review 2

*courtesy: Amy Austin*

(covering sections 7.2 - 7.3)

### Section 7.2

1. Find the volume of the solid obtained by revolving the region bounded by  $y = e^x$ ,  $y = 0$ ,  $x = 0$ ,  $x = 1$  about the  $x$ -axis.
2. Find the volume of the solid obtained by revolving the region bounded by  $y = 3x^2$ ,  $0 \leq x \leq 2$ ,  $y = 12$  and  $x = 0$  about the  $y$ -axis.
3. Find the volume of the solid obtained by revolving the region bounded by  $y = x^2$ ,  $y = 4x$ , about the  $x$ -axis, then the  $y$  axis.
4. Find the volume of the solid obtained by revolving the region bounded by  $y = x^2$ ,  $y = 4$ , about the line  $y = 4$ .
5. Find the volume of the solid obtained by revolving the region bounded by  $x = y^2$ ,  $x = 1$ , about the line  $x = 1$ .
6. Find the volume of the solid obtained by revolving the region bounded by  $y = x$ ,  $y = \sqrt{x}$ , about the line  $x = -1$ .
7. Find the volume of the solid  $S$  described here: The base of  $S$  is the region bounded by  $y = x^2$  and  $y = 4$ . Cross-sections perpendicular to the  $y$  axis are equilateral triangles.
8. Find the volume of the solid  $S$  described here: The base of  $S$  is the triangular region with vertices  $(0, 0)$ ,  $(3, 0)$  and  $(0, 2)$ . Cross-sections perpendicular to the  $x$  axis are semi-circles.
9. Find the volume of the solid  $S$  described here: The base of  $S$  is the ellipse  $\frac{x^2}{4} + \frac{y^2}{16} = 1$ . Cross sections perpendicular to the  $y$ -axis are squares.

### Section 7.3

10. Find the volume of the solid obtained by rotating the region bounded by the given curve(s) about the specified axis.

a.)  $y = \frac{1}{x^2}$ ,  $x = 2$ ,  $x = 4$ ,  $y = 0$  about the  $y$  axis.

b.)  $y = x^2$ ,  $y = 16$ ,  $x = 0$  about the  $x$ -axis.

c.)  $y = x^2$ ,  $y = 3x$ . Rotate around the  $x$ -axis. Now rotate around the  $y$  axis.

d.)  $y = x^3$ ,  $y = 0$ ,  $x = 1$ ,  $x = 2$ . Rotate around the line  $x = -1$ .

e.)  $y = \sqrt{x}$ ,  $x = 0$ ,  $x = 4$ ,  $y = 0$ . Rotate around the line  $y = 3$ .

f.)  $y = \cos x$ ,  $y = 0$ ,  $x = 0$ ,  $x = \frac{\pi}{2}$ . Rotate around the line  $y = 1$ . Now rotate around the line  $x = \frac{\pi}{2}$ . Do not evaluate either integral.

g.)  $y = \ln x$ ,  $y = 0$ ,  $x = 4$  about the  $y$  axis. Do not evaluate the integral.

h.)  $y = \sqrt{x}$ ,  $y = 2 - x$ ,  $y = 0$ , around the  $x$ -axis. Find the volume using two different techniques of your choosing.