**Final Exam Review**

## Chapter 6

Find the area of the region bounded by the given curves/lines.

**1.** $y = x^2 - 6$ and $y = x$  

**2.** $y = \sec(x)$, $y = 2\tan(x)$, from $x = 0$ to $x = \frac{\pi}{6}$

Find the volume of the solid of rotation. <u>Draw a typical rectangle in the diagram as well as the associated disk, washer or cylindrical shell</u>.

**3.** $y = \sin x$ and the $x$-axis, $0 \le x \le \pi$, rotated about the $x$-axis

**4.** $y = \ln(x)$, and the $x$-axis, $1 \le x \le e$, rotated about the $y$-axis

**5.** $y = \sin(x)$ and $y = \cos(x)$, $0 \le x \le \frac{\pi}{4}$, rotated about the $x$-axis

**Chapter 7:** Evaluate each using a technique of integration.

**6.** $\displaystyle \int x^3 e^{x^2}\, dx$

**7.** $\displaystyle \int x \tan^{-1} x\, dx$

**8.** $\displaystyle \int e^{\sqrt{x}}\, dx$

**9.** $\displaystyle \int x \sin x \cos x\, dx$

**10.** $\displaystyle \int (\sin x + \cos x)^2\, dx$

**11.** $\displaystyle \int \tan^3 x \sec^3 x\, dx$

**12.** $\displaystyle \int \frac{1}{x^2\sqrt{4 + x^2}}\, dx$

**13.** $\displaystyle \int \frac{1}{\sqrt{x^2 - 1}}\, dx$

**14.** $\displaystyle \int \frac{1}{x^3 + x^2}\, dx$

**15.** $\displaystyle \int \frac{1}{\sqrt{x}(1 + \sqrt{x})}\, dx$

**16.** $\displaystyle \int \frac{\sqrt{\ln x}}{x}\, dx$

**17.** $\displaystyle \int \frac{\ln x}{x^2}\, dx$