

## Math 125 Exam #2 Practice Problems

Exam #2 covers sections 6.1-6.3, 6.5, and 7.1-7.3. You will have 75 minutes for the exam and can use a calculator and a notesheet ( $8.5 \times 11$ , both sides, handwritten).

Here are **some** practice problems. You should also look at previous homework problems and worksheets.

1. Extra problems from the text:

Areas/Volumes/Average Value: Pgs. 468-469: 1-10, 15, 16, 23-25, 30-32

Methods of Integration: Pg. 541: 1-5, 7-12, 14-17, 20-24, 27, 30, 32-39

(Note: The problems on pg. 541 increase in difficulty, some being extremely difficult.)

2. Evaluate the following integrals. (There may be more than one way to evaluate.)

(a)  $\int \sin x \ln(\sec x) dx$

(b)  $\int \frac{t}{\sqrt{t^2 - 6t + 5}} dt$

(c)  $\int_0^{3\pi^2} \cos\sqrt{x + \pi^2} dx$

(d)  $\int 4\theta \sec^2(2\theta) d\theta$

(e)  $\int \sin^3 x \cos^7 x dx$

(f)  $\int \frac{dx}{(4 - x^2)^{3/2}}$

(g)  $\int x^3 e^{x^2} dx$

(h)  $\int \frac{x^3}{\sqrt{x^2 + 4}} dx$

3. Let  $R$  be the region bounded by the curve  $y = \sqrt[3]{x+1}$  and the  $x$ -axis for  $0 \leq x \leq 7$ . Find the volume of the solid obtained by revolving  $R$  about the  $y$ -axis. For extra practice, you may want to try to do this problem using washers and again using shells.

4. Find the average value of  $f(x) = \sin^{-1}x$  on the interval  $[\frac{1}{2}, 1]$ .

5. Let  $R$  be the region bounded by  $y = e^{2-x}$ , the line  $y = 1$ , and the  $y$ -axis. Find the volume of the solid obtained by revolving  $R$  about the  $y$ -axis.

6. For what value of  $k > 0$  do the functions  $f(x) = x^2$  and  $g(x) = 10 - x^2$  have the same average value on the interval  $[0, k]$ ?

**Checking Definite Integrals by Calculator:** If you have a TI-83 or above, you can check your definite integrals as follows.

To evaluate  $\int_a^b f(x) dx$ :

Press the "MATH" button.

Scroll down to the "FnInt(" option and press "Enter".

Type in the function and press the "," button.

Type in the variable used "X" and press the "," button.

Type in the lower bound and press the "," button.

Type in the upper bound and press the ")" button to close the operation.

Press "Enter".