Math 126 TEST II

Do not use any books or notes. You can use a calculator, but not graphing calculator. If you use a calculator, leave your results in exact form instead of decimal form. **Show all work for full credit.**

1. Determine whether each integral is convergent or divergent. Evaluate those that are convergent. (24 points)

(a) $\displaystyle\int_{-\infty}^{0} \frac{1}{2x-5}\,dx$ (b) $\displaystyle\int_{1}^{\infty} \frac{\ln x}{x^2}\,dx$ (c) $\displaystyle\int_{-1}^{1} \frac{1}{x^3}\,dx$

2. Use the Comparison Theorem to determine whether the integral is convergent or divergent. (16 points)

(a) $\displaystyle\int_1^\infty \frac{\cos^2 x}{1+x^2}\,dx$ (b) $\displaystyle\int_1^\infty \frac{1}{\sqrt{x^3+1}}\,dx$

3. Sketch the region enclosed by the given curves. Decide whether to integrate with respect to x or y. Then find the area of the region. (20 points)

(a) $y = x + 1, y = 9 - x^2, x = -1, x = 2.$

(b) $x + y^2 = 2, x + y = 0.$

4. Find the volume of the solid obtained by rotating the region bounded by the given curves about the specified line. You need to sketch the region. (20 points)

   (a) $y = e^x$, $y = 0$, $x = 0$, $x = 1$, about the x-axis.

   (b) $y = x$, $y = \sqrt{x}$, about $y = 1$.

5. Eliminate the parameter to find a Cartesian equation of the curve. Then sketch the curve and indicate with an arrow the direction in which the curve is traced as the parameter increases. (10 points)

(a) $x = 4\cos\theta, \quad y = 5\sin\theta, \quad -\dfrac{\pi}{2} \le \theta \le \dfrac{\pi}{2},$ (b) $x = e^t, \quad y = e^{-t}$

6. Find the exact length of $x = y^{3/2}$, $0 \le y \le 1$. (10 points)