Assignment #6 ***Math 181*** ***Name:***

1. Evaluate the following improper integrals:

a) $\int_0^{\infty} \frac{x}{e^{3x^2+1}}\,dx$

b) $\int_{-\infty}^{-1/2} \frac{1}{\left(1+4x^2\right)\left[\tan^{-1}\left(2x\right)\right]^3}\,dx$

c) $\int_{-\infty}^{\infty} \frac{x}{5x^2+3}\,dx$

d) $\int_{-1}^{0} \frac{x^2}{\sqrt{x^3+1}}\,dx$

e) $\int_0^{\frac{\pi}{6}} \sec^2(3x)\,dx$

f) $\int_0^2 \frac{dx}{(3x-1)^{2/3}}$

2. Test for convergence / divergence:

a) $\int_1^{\infty} \frac{7x^2+5x+3}{4x^5+3x^3+1}dx$

b) $\int_1^{\infty} \frac{2x+2^{x+1}+3}{x^4 2^x}dx$

c) $\int_1^{\infty} \frac{\sqrt{3x^4+5x^3+1}}{4x^3+x^2+2}dx$

d) $\int_0^{\pi/6} \frac{1}{x\sin(3x)}dx$

e) $\int_2^{\infty} \frac{5\cos^2(3x)+\tan^{-1}(2x)}{\sqrt[3]{8x^7+5x^4+3}}dx$

3. a) Find the area of the region bounded by $y = \frac{1}{x^4}$, $y = 0$ *for* $0 \le x \le 1$

b) Find the area of the region bounded by $y = \frac{1}{x^2}$, $y = 0$ *for* $x \ge 1$

4. Find the volume of the region bounded by the following curve which rotates about the x – axis.

a) $y = e^{-2x};\ y = 0;\ x \geq 0$

b) $y = \dfrac{1}{\sqrt[3]{x-2}};\ y = 0 \ \ for\ 2 \leq x \leq 10$