# Math 116 Homework 2

**Directions:** Except where indicated, merely finding the answer to a problem is not enough to receive credit. You must show how you arrived at that answer. DO NOT convert roots or transcendentals like $e$ into a decimal approximation; just leave them as they are.

**1)** Evaluate the following integrals:

a) $\displaystyle\int \frac{x^2+7}{(x-1)(x+4)}\,dx$

b) $\displaystyle\int \frac{dx}{(23x-1)^2(x+12)^2}$

c) $\displaystyle\int_0^3 \frac{x}{x^2+x-6}\,dx$

d) $\displaystyle\int -\frac{e^x}{e^{3x}-e^x}\,dx$

e) $\displaystyle\int_{e^8}^{\infty} \frac{(\ln(x))^{1/3}}{x}\,dx$

f) $\displaystyle\int_{-10}^{0} \frac{x^2}{(x^3+1000)^{\frac{1}{3}}}\,dx$

g) $\displaystyle\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$

**2)** Calculate the volume of the solid obtained by revolving the region $R$ bounded by the curves $y = x^{-1/8}$, $x = 0$, $x = 1$, and the $x$-axis about the $x$-axis.

**3)** Show that the improper integral

$$\int_{-\infty}^{-11} \frac{\sin^{22}(x)}{x^{13}}\,dx$$

CONVERGES. **Do not** attempt to establish what it converges to.

**4)** Show that the improper integral

$$\int_{37}^{\infty} \frac{\arctan 5x}{x^{1/8}}\,dx$$

DIVERGES.