Math 143
Fall, 2005
Quiz 11 - §7.3

Name: **Solutions**

Complete the following problems. Show all work to receive full credit.

1. Evaluate $\int \frac{x+3}{2x^3-8x}\,dx$

$$= \int \frac{x+3}{2x(x^2-4)}\,dx$$
$$= \int \frac{x+3}{2x(x-2)(x+2)}\,dx$$
$$= \int \frac{A}{2x} + \frac{B}{x-2} + \frac{C}{x+2}\,dx$$

Therefore, we need to solve:

$$A(x-2)(x+2) + B(2x)(x+2) + C(2x)(x-2) = x+3$$

Plugging in clever numbers we get:

$$\text{If } x = 0 : A(-2)(2) = 3$$
$$-4A = 3$$
$$A = \frac{-3}{4}$$
$$\text{If } x = 2 : B(4)(4) = 5$$
$$16B = 5$$
$$B = \frac{5}{16}$$
$$\text{If } x = -2 : C(-4)(-4) = 1$$
$$16C = 1$$
$$C = \frac{1}{16}$$

Therefore we need to integrate:

$$\int \frac{\frac{-3}{4}}{2x} + \frac{\frac{5}{16}}{x-2} + \frac{\frac{1}{16}}{x+2}\,dx$$
$$= -\frac{3}{4}\cdot\frac{1}{2}\ln\mid 2x\mid + \frac{5}{16}\ln\mid x-2\mid + \frac{1}{16}\ln\mid x+2\mid + C$$
$$= -\frac{3}{8}\ln\mid 2x\mid + \frac{5}{16}\ln\mid x-2\mid + \frac{1}{16}\ln\mid x+2\mid + C$$