MATH 6 – RECITATION WORKSHEET 4
24 FEBRUARY 2012

Today, we'll answer a question: Is it true that the product of the integrals is the integral of the products? That is,

$$\int f(x)g(x)\,dx \stackrel{?}{=} \left(\int f(x)\,dx\right)\left(\int g(x)\,dx\right).$$

1. We'll compute the two sides of the equation above for various choices of f and g and see if they're equal.

(a) Is $\int x^2\,dx = \left(\int x\,dx\right)\left(\int x\,dx\right)$?

(b) Is $\int 1\,dx = \left(\int \frac{1}{x}\,dx\right)\left(\int x\,dx\right)$?

(c) Is $\int (x+1)x\,dx = \left(\int x+1\,dx\right)\left(\int x\,dx\right)$?

2. Notice that we can multiply any function by 1, and it will stay the same. What would happen if $\int f(x)\cdot 1\,dx = \left(\int f(x)\,dx\right)\left(\int 1\,dx\right)$?

Now that we (hopefully) see that we can't just multiply the integrals, let's see what we can do instead.

3. What method should we use to compute the following integral?

$$\int x^{1/3}(x^{4/3}+2)^2\,dx$$

4. What method should we use to compute the following integral?

$$\int \sqrt{x}(x^3+2x+1)\,dx$$