

## Math 142: Section 8.1 - Notes

### 1 Using Basic Integration Formulas

**A review** The basic integration formulas summarize the forms of indefinite integrals for many of the functions we have studied so far, and the substitution method helps us use the table to evaluate more complicated functions involving these basic ones. So far, we have seen how to apply the formulas directly and how to make certain  $u$  substitutions. Sometimes we can rewrite an integral to match it to a standard form. More often, we will need more advanced techniques for solving integrals. First, let's look at some examples of our known methods.

**Example 1 - Substitution** Evaluate the integral

$$\int_3^5 \frac{2x - 3}{\sqrt{x^2 - 3x + 1}} dx.$$

**Example 2 - Complete the square** Complete the square to evaluate

$$\int \frac{dx}{\sqrt{8x - x^2}}.$$

**Example 3 - Trig Identities** Evaluate the integral

$$\int (\cos x \sin 2x + \sin x \cos 2x) dx.$$

**Example 4 - Trig Identities** Find

$$\int_0^{\pi/4} \frac{dx}{1 - \sin x}.$$

**Example 5 - Clever Substitution** Evaluate

$$\int \frac{dx}{(1 + \sqrt{x})^3}.$$

**Example 6 - Properties of Trig Integrals** Evaluate

$$\int_{-\pi/2}^{\pi/2} x^3 \cos x dx.$$