**Review**

For u-substitution, we have to recognize that the integrand is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

function, multiplied by something that looks like (is a constant multiple of) the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

of the inside function. U-substitution “undoes” the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rule.

Find .

**Integration by Parts**

Today we learn to “undo” the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rule. Recall that for and

Integrating both sides of the equation gives

Rearranging gives

If we let and , then and , then we can rewrite the whole thing a lot more succinctly as

That last equation is the most familiar formula for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_.

**Example 1.** Find .

The goal in integration by parts is for to be simpler than , so we generally want to choose so that is simpler than . A good mnemonic device to guide your choice of is LogPoET. First chose any **Log**arithms, then **Po**lynomials, then **E**xponential functions, and lastly **T**rigonometric functions.

**Example 2.** Find .

If we’re trying to compute a *definite* integral, we need to be careful when applying the FTC.

**Example 3.** Find .

**Example 4.** Find .