Integration by Parts Groupwork Final Answers

MATH 131: Calculus II, Section 1
March 12, 2014

(1) $\displaystyle\int_0^{\frac{\pi}{4}} x \sec^2 x \; dx$

$$\frac{\pi}{4} - \frac{1}{2}\ln 2$$

(2) $\displaystyle\int \arctan x \; dx$

$$x \arctan x - \frac{1}{2}\ln|x^2 + 1| + C$$

(3) $\displaystyle\int x^2 \sin x \; dx$ (Note: This has a small extra twist!)

$$-x^2 \cos x + 2x \sin x + 2\cos x + C$$

(4) $\displaystyle\int e^x \cos(2x) \; dx$ (Note: This one involves an extra cool trick! Look for patterns!)

$$\frac{1}{5}[e^x \cos(2x) + 2e^x \sin(2x)] + C$$

(5) Challenge/Preview: $\displaystyle\int_0^1 \ln(x^2 + 1) \; dx$ (Note: you should end up with an improper fraction at some point. That is, a fraction whose numerator has a degree at least as large as its denominator. How can you eliminate the improper fraction?)

$$\ln 2 - 2 + \frac{\pi}{2}$$