

Name: Prof Deutsch

Section (Please Circle)

Date: _____

B2 (W 9-10), B3 (W 2-3)

Prof. Deutsch

Fall 2014

MA 226 Quiz Sec 1-1 Practice

1. Use the method of partial fractions to integrate

$$\int \frac{3x+11}{(x-3)(x+2)} dx$$

$$\frac{3x+11}{(x-3)(x+2)} = \frac{A}{x-3} + \frac{B}{x+2}$$

$$= \frac{A(x+2) + B(x-3)}{(x-3)(x+2)}$$

$$= \frac{(A+B)x + (2A-3B)}{(x-3)(x+2)}$$

$$\Rightarrow \begin{cases} A+B=3 \\ 2A-3B=11 \end{cases} \Rightarrow \begin{cases} 3A+3B=9 \\ 2A-3B=11 \end{cases} \Rightarrow \begin{cases} 5A=20 \\ \Rightarrow A=4 \\ \Rightarrow B=-1 \end{cases}$$

$$\therefore \frac{3x+11}{(x-3)(x+2)} = \frac{4}{x-3} - \frac{1}{x+2}$$

$$\int \frac{3x+11}{(x-3)(x+2)} dx = \int \frac{4}{x-3} - \frac{1}{x+2} dx$$

$$= 4 \ln|x-3| - \ln|x+2| + C$$

2. Use the method of integration by parts to integrate

$$\int_{x=0}^{\pi/2} x \cdot \cos(x) dx =$$

$$\begin{aligned} \int_0^{\pi/2} \underbrace{x}_{u} \cdot \underbrace{\cos x}_{dv} dx &= \underbrace{x \sin x}_{u \cdot v} \Big|_0^{\pi/2} - \int_0^{\pi/2} \underbrace{\sin x}_{v} dx \\ &= x \sin x \Big|_0^{\pi/2} + \cos x \Big|_0^{\pi/2} \\ &= \left(\frac{\pi}{2} \cdot 1 - 0 \right) + (0 - 1) \\ &= \frac{\pi}{2} - 1 \end{aligned}$$

$du = 1 dx \quad v = \sin x$