

Section 7.1 #1 pg 476

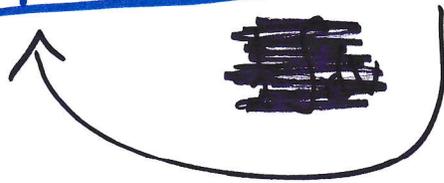
$$\int x e^{2x} dx \quad u = x \quad dv = e^{2x} dx$$
$$\downarrow$$
$$du = dx \quad v = \frac{1}{2} e^{2x}$$

$$\int f(x) g'(x) dx = f(x) g(x) - \int g(x) f'(x) dx$$

$$f(x) = x \quad g'(x) = e^{2x}$$
$$f'(x) = 1 \quad g(x) = \frac{1}{2} e^{2x}$$

$$\int x e^{2x} dx = x \left( \frac{1}{2} e^{2x} \right) - \int \frac{1}{2} e^{2x} dx$$

$$= \frac{1}{2} x e^{2x} - \frac{1}{4} e^{2x} + C$$



$$\frac{1}{2} \int dv$$

Section 7.1 #3 pg 476

$$\int x \cos 5x \, dx$$

$$u = x \quad dv = \cos 5x \, dx$$

$$du = dx \quad v = \frac{1}{5} \sin 5x \rightarrow \frac{1}{5} v = \sin 5x$$

$$\int f(x) g'(x) \, dx = f(x) g(x) - \int g(x) f'(x) \, dx$$

$$f(x) = x \quad g'(x) = \cos 5x$$

$$f'(x) = 1 \quad g(x) = \frac{1}{5} \sin 5x$$

$$= x \left( \frac{1}{5} \sin 5x \right) - \int \frac{1}{5} \sin 5x \, dx$$

$$= \frac{1}{5} x \sin 5x - \frac{1}{5} \int \sin 5x \, dx$$

$$\rightarrow -\frac{1}{5} \cos 5x$$

$$= \frac{1}{5} x \sin 5x + \frac{1}{25} \cos 5x + C$$

Section 7.1 #13 pg 476

$$\int t \csc^2 t \, dt$$

$$u = t \quad dv = \csc^2 t \, dt$$
$$du = dt \quad v = -\cot t$$

$$f(x) = t \quad g'(x) = \csc^2 t$$
$$f'(x) = 1 \quad g(x) = -\cot t$$
$$\int f(x) g'(x) dx = f(x) g(x) - \int g(x) f'(x) dx$$

$$= t \cot t - \int -\cot t \, dt$$

$$\int \frac{\cos t}{\sin t} dt \quad \begin{matrix} \nearrow \\ z = \sin t \\ dz = \cos t \, dt \end{matrix}$$

$$\int \frac{1}{z} dz = \ln |z| + C = \ln |\sin t| + C$$

$$= -t \cot t + \ln |\sin t| + C$$

$$\int_0^2 y \sinh y \, dy$$

$$u = y \quad dv = \sinh y \, dy$$

$$du = dy \quad v = \cosh y$$

$$\int_0^2 y \sinh y \, dy = [y \cosh y]_0^2 - \int_0^2 \cosh y \, dy$$

$$(0)(\cosh(0)) - 2 \cosh(2)$$

$$\leftarrow 2 \cosh(2) - 0$$

$$[\sinh y]_0^2$$

~~$$\sinh(2) - \sinh(0)$$~~

$$\sinh(2) - \sinh(0)$$

$$\boxed{+ 2 \cosh 2 + \sinh(2)}$$

~~sign is different~~  
~~then here but~~  
~~can find why.~~

Section 7.1 # 27

Pg 476

$$\int_1^5 \frac{\ln R}{R^2} dR$$

$$u = \ln R \quad dv = \frac{1}{R^2} dR$$
$$du = \frac{1}{R} dR \quad v = -\frac{1}{R}$$

$$\int_1^5 \frac{\ln R}{R^2} dR = \left[ -\frac{1}{R} \ln R \right]_1^5 - \int_1^5 -\frac{1}{R^2} dR$$

$$\downarrow \qquad \qquad \qquad \downarrow$$
$$-\frac{1}{5} \ln 5 - \left[ -\frac{1}{R} \right]_1^5$$

$$-\frac{1}{5} \ln 5 \qquad \frac{1}{5} - \frac{1}{1} = -\frac{4}{5}$$

$$\boxed{-\frac{1}{5} \ln 5 + \frac{4}{5}}$$

$$\int_0^{\pi} x \sin x \cos x \, dx$$

$$\frac{1}{2} \sin 2x = \sin x \cos x$$

$$\frac{1}{2} \int_0^{\pi} x \sin 2x \, dx$$

$$u = x \quad dv = \sin 2x \, dx$$

$$du = dx \quad v = -\frac{1}{2} \cos 2x$$

$$\frac{1}{2} \left[ -\frac{1}{2} x \cos 2x \right]_0^{\pi} - \frac{1}{2} \int_0^{\pi} -\frac{1}{2} \cos 2x \, dx$$

$$\downarrow$$

$$-\frac{1}{4} \pi \cos 2\pi + \frac{1}{4} 0 \cos 2(0)$$

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

$$\downarrow$$

$$\frac{1}{4} \left[ \frac{1}{2} \sin 2x \right]_0^{\pi}$$

Both  $\sin 0$  and  $\sin 2\pi = 0$

$$\boxed{-\frac{\pi}{4}}$$