

Section 4.5 pg 305 #19

$$\int 5x\sqrt[3]{1-x^2} dx$$

Rewrite:

$$\int 5x(1-x^2)^{1/3} dx$$

$$\text{Let } u = 1-x^2$$

$$\Rightarrow du = -2x^2 dx$$

$$\Rightarrow -\frac{1}{2} du = x^2 dx$$

$$\Rightarrow -\frac{5}{2} du = 5x^2 dx \quad \checkmark$$

$$= -\frac{5}{2} \int u^{1/3} du$$

$$= -\frac{5}{2} \cdot \frac{u^{4/3}}{4/3} + C$$

$$= -\frac{5}{2} \cdot \frac{3}{4} (1-x^2)^{4/3} + C$$

$$= -\frac{15}{8} (1-x^2)^{4/3} + C$$

Section 5.2 pg 330 #27

$$\int \frac{6x}{(x-5)^2} dx$$

Rewrite:

$$\int 6x(x-5)^{-2} dx$$

Double Linear Scenario

$$\text{Let } u = x-5 \Rightarrow u+5 = x$$

$$\Rightarrow du = dx$$

$$\Rightarrow 6du = 6dx \quad \checkmark$$

$$= 6 \int (u+5)u^{-2} du$$

$$= 6 \int (u^{-1} + 5u^{-2}) du$$

$$= 6 \int \left(\frac{1}{u} + 5u^{-2} \right) du$$

$$= 6 \left[\ln|u| + \frac{5u^{-1}}{-1} \right] + C$$

$$= 6 \left[\ln|x-5| - 5(x-5)^{-1} \right] + C$$