

Math 260 – Quiz # 1d

(Review for integration)

Name: _____ Sec. _____ ID: _____

Evaluate each one of the given integrals

$$1. \int \frac{dx}{1-x^2} = \int \frac{1}{(1-x)(1+x)} dx$$

$$\frac{1}{(1-x)(1+x)} = \frac{A}{1-x} + \frac{B}{1+x} = \frac{A(1+x) + B(1-x)}{(1-x)(1+x)}$$

$$A(1+x) + B(1-x) = 1$$

$$x=1 \Rightarrow A = \frac{1}{2}$$

$$x=-1 \Rightarrow B = -\frac{1}{2}$$

$$\begin{aligned} \therefore \int \frac{dx}{1-x^2} &= \int \left[\frac{\frac{1}{2}}{1-x} + \frac{-\frac{1}{2}}{1+x} \right] dx = \frac{1}{2} \int \left[\frac{1}{1-x} + \frac{1}{1+x} \right] dx = \frac{1}{2} \left[-\ln|1-x| + \ln|1+x| \right] + C \\ &= \frac{1}{2} \ln \left| \frac{1+x}{1-x} \right| + C \end{aligned}$$

$$2. \int \frac{du}{u^2+1} = \tan^{-1} u + C$$

$$\begin{aligned} 3. \int (5x+2)^7 dx &= \frac{1}{5} \int 5(5x+2)^7 dx \\ &= \frac{1}{5} \frac{(5x+2)^8}{8} + C = \frac{1}{40} (5x+2)^8 + C \end{aligned}$$

$$4. \int 4xe^x dx = 4e^x(x-1) + C$$

See Version 1a[2].