

Math 2B: Quiz 5A Solutions

Exercise 1(3 points) Evaluate the integral

$$\int \frac{1}{x^2 \sqrt{x^2 - 25}} dx$$

Let $x = 5 \sec(\theta)$, then $dx = 5 \sec(\theta) \tan(\theta)$. So we get

$$\begin{aligned} \int \frac{1}{25 \sec^2(\theta) 5 \tan(\theta)} 5 \sec(\theta) \tan(\theta) &= \frac{1}{25} \int \cos(\theta) \\ &= \frac{1}{25} \sin(\theta) + C = \frac{\sqrt{x^2 - 25}}{25x} + C \end{aligned}$$

Exercise 2 (3 points) Evaluate the integral

$$\int \frac{1}{z^2 \sqrt{16 - z^2}} dz$$

Let $z = 4 \sin(\theta)$ so $dz = 4 \cos(\theta)$. So we get

$$\begin{aligned} \int \frac{1}{16 \sin^2(\theta) 4 \cos(\theta)} 4 \cos(\theta) &= \frac{1}{16} \int \csc^2(\theta) \\ &= \frac{-1}{16} \cot(\theta) + C = \frac{-\sqrt{16 - z^2}}{z} + C \end{aligned}$$

Exercise 3(4 points) Evaluate the integral

$$\begin{aligned} \int \frac{2}{(x-2)(x+3)} dx \\ = \int \frac{\frac{2}{5}}{x-2} - \frac{\frac{2}{5}}{x+3} = \frac{2}{5} \ln|x-2| - \frac{2}{5} \ln|x+3| + C \end{aligned}$$