

4.8.57

Evaluate $\int (\sin(2x) - \csc^2(x)) dx$.Solution

Well... if we differentiate $\cos(2x)$ then we get $\frac{d}{dx} [\cos(2x)] = -\sin(2x) [2]$
 $= -2 \sin(2x)$.

So an antiderivative of $\sin(2x)$ is $-\frac{1}{2} \cos(2x)$.

Next, what do we differentiate to get $-\csc^2(x)$? It's $\cot(x)$, because

$$\frac{d}{dx} [\cot(x)] = -\csc^2(x).$$

$$\text{So, } \int (\sin(2x) - \csc^2(x)) dx$$

$$= \boxed{-\frac{1}{2} \cos(2x) + \cot(x) + C.} \quad \square$$