

## Integration – Q2 [Problem/M] (21/11/23)

Explain the following 'paradox':

$$\int \frac{1}{2x} dx = \frac{1}{2} \int \frac{1}{x} dx = \frac{1}{2} \ln x + C$$

but  $\int \frac{1}{2x} dx = \frac{1}{2} \ln(2x) + C$  (by the reverse Chain rule)

**Solution**

$\ln(2x)$  can be written as  $\ln 2 + \ln x$ , giving the first form of the answer, after renaming the constant