

## Property: Constant in Integral

For any function  $f$  and constant  $c \in \mathbb{R}$

$$\int cf(x) dx = c \int f(x) dx$$

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### Proof

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- Suppose that  $F(x)$  is an anti-derivative of  $f(x)$ , that is  $F'(x) = f(x)$  since we can pull constants out of derivatives we have

$$(cF(x))' = cF'(x) = cf(x)$$

- Therefore  $cF(x)$  is an anti-derivative of  $cf(x)$ , therefore

$$\int cf(x) dx = cF(x) + m = c\left(F(x) + \frac{m}{c}\right) = c \int f(x) dx$$

