

1. Evaluate the following integrals:

$$(a) \int \frac{\ln(x)}{5x} dx$$

$$(c) \int x \tan(x^2) dx$$

$$(b) \int x \sqrt[3]{x+2} dx$$

$$(d) \int \frac{1}{\sqrt{x} (\sqrt{x} + 2)^3} dx$$

2. Consider the indefinite integral $\mathcal{I} = \int 2 \sin(x) \cos(x) dx$

(a) Evaluate \mathcal{I} by substituting $u = \sin(x)$.

(b) Evaluate \mathcal{I} by substituting $u = \cos(x)$.

(c) Explain your answers to (a) and (b).