4.5 Videos Guide

4.5a

- The Substitution Rule
  - If $u = g(x)$ is a differentiable function whose range is an interval I and f is continuous on I, then
    $$\int f\big(g(x)\big)g'(x)\,dx = \int f(u)\,du$$
    This is the reverse of the Chain Rule for differentiation.

Exercises:

- Evaluate.
  - $\int x^2 \sin(x^3)\ dx$

4.5b

  - $\int y^2(4 - y^3)^{2/3}\,dy$
  - $\int \frac{\sin\sqrt{x}}{\sqrt{x}}\ dx$
  - $\int \sin x \sin(\cos x)\ dx$
  - $\int \frac{dt}{\cos^2 t\sqrt{1+\tan t}}$

4.5c

  - $\int_0^{\sqrt{\pi}} x\cos(x^2)\ dx$
  - $\int_0^a x\sqrt{a^2 - x^2}\,dx$

4.5d

  - $\int_{-\pi/3}^{\pi/3} x^4 \sin x\ dx$
  - $\int x\sqrt{x+2}\,dx$
  - $\int x^2\sqrt{2+x}\,dx$