• Try the **Substitution Method** when the integrand has the form \(f(u(x))u'(x)\). If \(F\) is an antiderivative of \(f\), then
\[
\int f(u(x))u'(x)\,dx = F(u(x)) + C
\]

• The differential of \(u(x)\) is related to \(dx\) by \(du\).

• The **Change of Variables Formula** says that
  - For indefinite integrals: \(\int f(u(x))u'(x)\,dx = \) \(\) \(\)
  - For definite integrals: \(\int_a^b f(u(x))u'(x)\,dx = \) \(\) \(\)

**Practice Problems**

(1) Evaluate the indefinite integral.

(a) \(\int x(x + 1)^9\,dx\)

(b) \(\int \sin(2x - 4)\,dx\)

(c) \(\int \frac{x^3}{(x^4 + 1)^4}\,dx\)

(d) \(\int \sqrt{4x - 1}\,dx\)

(e) \(\int x\cos(x^2)\,dx\)

(f) \(\int \sin^5 x\cos x\,dx\)

(g) \(\int \sec^2 x \tan^4 x\,dx\)

(h) \(\int \frac{dx}{(2 + \sqrt{x})^3}\)

(2) Evaluate the definite integral.

(a) \(\int_0^1 \frac{x}{x^2 + 1}\,dx\)

(b) \(\int_{-9}^{17} (x - 9)^{-2/3}\,dx\)

(c) \(\int_{-8}^{8} \frac{x^{15}}{3 + \cos^2 x}\,dx\)

(d) \(\int_0^{\pi/2} \sec^2(\cos \theta) \sin \theta\,d\theta\)

(e) \(\int_{-4}^{-2} \frac{12x\,dx}{(x^2 + 2)^3}\)

(f) \(\int_1^8 \sqrt{t + 8}\,dt\)

(g) \(\int_0^{\pi/3} \frac{\sin \theta}{\cos^{3/2} \theta}\,d\theta\)

(h) \(\int_{-2}^{4} |(x - 1)(x - 3)|\,dx\)