8.6: Integration Strategies

Example. What integration methods can be used to evaluate the functions below? (No need to evaluate the integral)

$$\int \frac{1}{1-x^2}\,dx$$

$u = 1-x^2$
$du = -2x\,dx$

$$\int x\sec^2(x)\,dx$$

$u = x$
$du = dx$

$PFD: \quad \frac{1}{1-x^2} = \frac{A}{1+x} + \frac{B}{1-x}$

IBP

$Trig\ sub: \quad x = 1\sin\theta$

$$\int \frac{x}{\sqrt{64-x^2}}\,dx$$

$$\int \frac{x^3}{\sqrt{64-x^2}}\,dx$$

Example. Identify two integration techniques which can be used to evaluate

$$\int \frac{4 - 3x^2}{x(x^2 - 4)} \, dx.$$

Example. Perform a substitution of variables to rewrite $\int x \sin(\sqrt{x}) \, dx$.

Example. $\displaystyle\int_1^3 \frac{\tan^{-1}\left(\sqrt{x}\right)}{x^{1/2} + x^{3/2}}\, dx$