

2-3 Videos Guide

2-3a

Exercise:

- Evaluate the integral.

$$\int \frac{x^3}{\sqrt{x^2 + 4}} dx$$

2-3b

- Pattern recognition for substitutions

- $\sqrt{x^2 + a^2} \rightarrow x = a \tan \theta \Rightarrow \sqrt{x^2 + a^2} = a \sec \theta$
- $\sqrt{x^2 - a^2} \rightarrow x = a \sec \theta \Rightarrow \sqrt{x^2 - a^2} = a \tan \theta$
- $\sqrt{a^2 - x^2} \rightarrow x = a \sin \theta \Rightarrow \sqrt{a^2 - x^2} = a \cos \theta$

Exercises:

Evaluate the integral.

2-3c

- $\int \frac{dt}{t^2 \sqrt{t^2 - 16}}$
- $\int_0^3 \frac{x}{\sqrt{36 - x^2}} dx$

2-3d

- $\int_0^{2/3} \sqrt{4 - 9x^2} dx$

2-3e

- $\int \frac{x^2}{(3+4x-4x^2)^{3/2}} dx$