

# Strategies for Integration

## Learning Goals

- Find an appropriate method to evaluate an integral
- Evaluate an integral using a combination of methods of integration
- Evaluate an integral by first applying an algebraic manipulation of the integrand

## Contents

<b>1</b>	<b>Summary of Methods</b>	<b>2</b>
<b>2</b>	<b>Substitution Methods</b>	<b>4</b>
<b>3</b>	<b>Integration by Parts</b>	<b>7</b>
<b>4</b>	<b>Special Techniques</b>	<b>9</b>

# 1 Summary of Methods

In this section, we put everything from earlier in this chapter together. How do we analyze an integral problem to figure out how we should attack it to get the solution?

What methods do we have?

1. Algebraic simplification
2. Substitution
3. Integration by parts
4. Special Techniques

## Algebraic Simplification

**Example:** Compute  $\int \frac{x^4 + 3x - 5}{x^{3/2}} dx$

## 2 Substitution Methods

**Example:** Compute  $\int x^7 \sqrt{1+x^4} dx$

**Example:** Compute  $\int \frac{x^{1/4}}{x^{1/3} - 16} dx$

### 3 Integration by Parts

**Example:** Compute  $\int_0^1 \arctan(2x) dx$



## 4 Special Techniques

**Example:** Compute  $\int \frac{\sqrt{9 - 4x^2}}{x} dx$