Pre-Calculus 11
Chapter 3: Trigonometry

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Chapter Overview

This chapter covers the fundamentals of trigonometry, including:

- Basic trigonometric functions and ratios

- Angles in standard position

- Special triangles and exact values

- Solving angles in all four quadrants

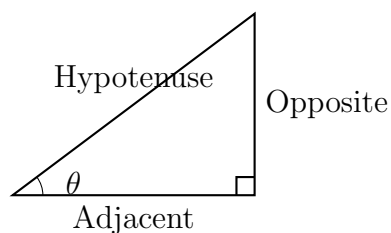- Sine Law and its ambiguous case

- Cosine Law

1 3.1 Basic Trigonometric Functions

Key Concepts

> **Trig Ratios**
>
> - $\sin\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$
>
> - $\cos\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$
>
> - $\tan\theta = \frac{\text{Opposite}}{\text{Adjacent}}$
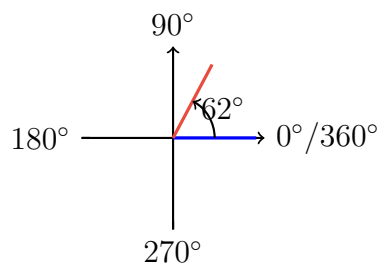>
> - Pythagorean Theorem: $a^2 + b^2 = c^2$

Diagram

2   3.2 Angles in Standard Position

Key Concepts

> **Standard Position**
>
> - Angles measured from the positive x-axis
>
> - Quadrants I-IV
>
> - Reference angle: always positive, between terminal arm and x-axis
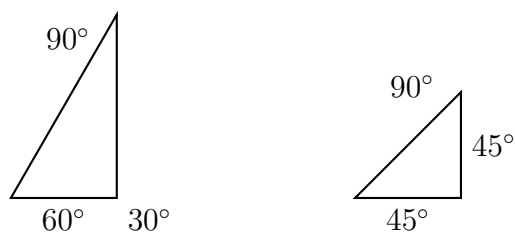
Diagram

3   3.3 Special Triangles

Key Concepts

> **Special Triangles**
>
> - 30°-60°-90° and 45°-45°-90° triangles
>
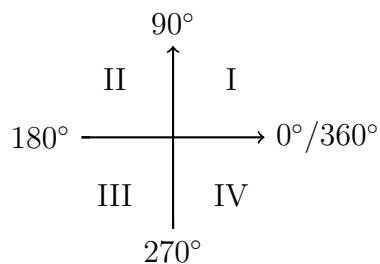> - Exact values for sin, cos, tan of special angles

Diagrams

4 3.4 Solving Angles in All Four Quadrants

Key Concepts

Quadrant Rules

- ASTC rule: All Students Take Calculus (signs of trig functions in each quadrant)

- Reference angle method for finding all solutions

Diagram

5 3.5 Sine Law

Key Concepts

Sine Law

- $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
- Use for non-right triangles when you have an angle and its opposite side

6 3.6 Ambiguous Case of the Sine Law

Key Concepts

Ambiguous Case (SSA)

- SSA case: two sides and a non-included angle

- May yield 0, 1, or 2 possible triangles

- Check for ambiguous case when using Sine Law

7 3.7 Cosine Law

Key Concepts

Cosine Law

- $a^2 = b^2 + c^2 - 2bc \cos A$ (and cyclic)

- Use for non-right triangles with SAS or SSS

Chapter Summary

Key Takeaways

- Know all basic trig ratios and how to use SOH-CAH-TOA

- Understand reference angles and quadrant rules

- Memorize special triangles and exact values

- Apply Sine Law and Cosine Law to solve triangles

- Always check for the ambiguous case in SSA