Name _____

Chapter 5 Analytic Trigonometry

Course Number
Instructor
Date

Section 5.1 Using Fundamental Identities

Objective: In this lesson you learned how to use fundamental trigonometric identities to evaluate trigonometric functions and simplify trigonometric expressions.

What you should learn
How to recognize and write the fundamental trigonometric identities

I. Introduction (Page 374)

Name four ways in which the fundamental trigonometric identities can be used:

1)

2)

3)

4)

The Fundamental Trigonometric Identities

List six reciprocal identities:

1)

2)

3)

4)

5)

6)

List two quotient identities:

1)

2)

List three Pythagorean identities:

1)

2)

3)

List six cofunction identities:

1)

2)

3)

4)

5)

6)

List six even/odd identities:

1)

2)

3)

4)

5)

6)

II. Using the Fundamental Identities (Pages 375–378)

What you should learn
How to use the fundamental trigonometric identities to evaluate trigonometric functions, simplify trigonometric expressions, and rewrite trigonometric expressions

Example 1: Explain how to use the fundamental trigonometric identities to find the value of $\tan u$ given that $\sec u = 2$.

Example 2: Explain how to use the fundamental trigonometric identities to simplify $\sec x - \tan x \sin x$.

Additional notes

Homework Assignment

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Exercises 1–23 odd

Course Number

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Section 5.2 Verifying Trigonometric Identities

Objective: In this lesson you learned how to verify trigonometric identities.

I. Introduction (Page 382)

What you should learn
How to plan a strategy for verifying trigonometric identities

The key to verifying identities is . . .

An identity is . . .

II. Verifying Trigonometric Identities (Pages 382–386)

What you should learn
How to verify trigonometric identities

Complete the following list of guidelines for verifying trigonometric identities:

1)

2)

3)

4)

5)

Example 1: Describe a strategy for verifying the identity $\sin\theta \tan\theta + \cos\theta = \sec\theta$. Then verify the identity.

Example 2: Describe a strategy for verifying the identity $\sin^2 x(\csc x - 1)(\csc x + 1) = 1 - \sin^2 x$. Then verify the identity.

Example 3: Verify the identity $\cot^5 \alpha = \cot^3 \alpha \csc^2 \alpha - \cot^3 \alpha$.

Additional notes

Homework Assignment

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Exercises 25–32

Course Number

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Section 5.3 Solving Trigonometric Equations

Objective: In this lesson you learned how to use standard algebraic techniques and inverse trigonometric functions to solve trigonometric equations.

I. Introduction (Pages 389–391)

What you should learn
How to use standard algebraic techniques to solve trigonometric equations

To solve a trigonometric equation, . . .

The preliminary goal in solving trigonometric equations is . . .

How many solutions does the equation $\sec x = 2$ have? Explain.

Example 1: Solve $2\cos^2 x - 1 = 0$.

To solve an equation in which two or more trigonometric functions occur, . . .

II. Equations of Quadratic Type (Pages 391–393)

What you should learn
How to solve trigonometric equations of quadratic type

Give an example of a trigonometric equation of quadratic type.

To solve a trigonometric equation of quadratic type, . . .

Example 2: Solve $\tan^2 x + 2\tan x = -1$.

Care must be taken when squaring both sides of a trigonometric equation to obtain a quadratic because . . .

III. Functions Involving Multiple Angles (Page 394)

Give an example of a trigonometric function of multiple angles.

What you should learn
How to solve trigonometric equations involving multiple angles

Example 3: Solve $\sin 4x = \frac{\sqrt{2}}{2}$.

IV. Using Inverse Functions (Page 395)

Example 4: Use inverse functions to solve the equation $\tan^2 x + 4\tan x + 4 = 0$.

What you should learn
How to use inverse trigonometric functions to solve trigonometric equations

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Exercises 33 – 49 odd

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Section 5.4 Sum and Difference Formulas

Objective: In this lesson you learned how to use sum and difference formulas to rewrite and evaluate trigonometric functions.

What you should learn
How to use sum and difference formulas to evaluate trigonometric functions, verify identities, and solve trigonometric equations

I. Using Sum and Difference Formulas (Pages 400–403)

List the **sum and difference formulas** for sine, cosine, and tangent.

Example 1: Use a sum or difference formula to find the exact value of tan 255°.

Example 2: Find the exact value of cos 95° cos 35° + sin 95° sin 35°.

A **reduction formula** is . . .

Example 3: Derive a reduction formula for $\sin\left(t+\frac{\pi}{2}\right)$.

Example 4: Find all solutions of $\cos(x-\frac{\pi}{3})+\cos(x+\frac{\pi}{3})=1$ in the interval $[0, 2\pi)$.

Additional notes

Homework Assignment

Page(s) 420

Exercises 51–73 odd

Course Number

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Section 5.5 Multiple-Angle and Product-to-Sum Formulas

Objective: In this lesson you learned how to use multiple-angle formulas, power-reducing formulas, half-angle formulas, and product-to-sum formulas to rewrite and evaluate trigonometric functions.

What you should learn
How to use multiple-angle formulas to rewrite and evaluate trigonometric functions

I. Multiple-Angle Formulas (Pages 407–409)

The most commonly used multiple-angle formulas are the _____, which are listed below:

$\sin 2u =$ _____

$\cos 2u =$ _____

$=$ _____

$=$ _____

$\tan 2u =$ _____

To obtain other multiple-angle formulas, . . .

Example 1: Use multiple-angle formulas to express $\cos 3x$ in terms of $\cos x$.

II. Power-Reducing Formulas (Page 410)

What you should learn
How to use power-reducing formulas to rewrite and evaluate trigonometric functions

Power-reducing formulas can be used to . . .

The power-reducing formulas are:

$\sin^2 u =$ _____

$\cos^2 u =$ _____

$\tan^2 u =$ _____

III. Half-Angle Formulas (Pages 410–411)

What you should learn
How to use half-angle formulas to rewrite and evaluate trigonometric functions

List the **half-angle formulas:**

$\sin\frac{u}{2} =$ _____

$\cos\frac{u}{2} =$ _____

$\tan\frac{u}{2} =$ _____ = _____

The signs of $\sin(u/2)$ and $\cos(u/2)$ depend on . . .

Example 2: Find the exact value of $\tan 15°$.

IV. Product-to-Sum Formulas (Pages 411–413)

What you should learn
How to use product-to-sum and sum-to-product formulas to rewrite and evaluate trigonometric functions

The **product-to-sum formulas** can be used to . . .

The product-to-sum formulas are:

$\sin u \sin v =$ _____

$\cos u \cos v =$ _____

$\sin u \cos v =$ _____

$\cos u \sin v =$ _____

Example 3: Write $\cos 3x \cos 2x$ as a sum or difference.

The **sum-to-product formulas** can be used to . . .

The sum-to-product formulas are:

$\sin x + \sin y =$ _____

$\sin x - \sin y =$ _____

$\cos x + \cos y =$ _____

$\cos x - \cos y =$ _____

Example 4: Write $\cos 4x + \cos 2x$ as a sum or difference.

Additional notes

Homework Assignment

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Exercises 75–101 odd