

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.

Course Number

Instructor

Date

I. Multiple-Angle Formulas (Pages 387–389)

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

$$\sin 2u = \underline{\hspace{2cm}}$$

$$\cos 2u = \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

$$= \underline{\hspace{2cm}}$$

$$\tan 2u = \underline{\hspace{2cm}}$$

To obtain other multiple-angle formulas, . . .

What you should learn

How to use multiple-angle formulas to rewrite and evaluate trigonometric functions

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

II. Power-Reducing Formulas (Page 389)

The double-angle formulas can be used to obtain the _____.

What you should learn

How to use power-reducing formulas to rewrite and evaluate trigonometric functions

The power-reducing formulas are:

$$\sin^2 u = \underline{\hspace{2cm}}$$

$$\cos^2 u = \underline{\hspace{2cm}}$$

$$\tan^2 u = \underline{\hspace{2cm}}$$

III. Half-Angle Formulas (Pages 390–391)

List the **half-angle formulas**:

$$\sin \frac{u}{2} = \underline{\hspace{2cm}}$$

$$\cos \frac{u}{2} = \underline{\hspace{2cm}}$$

$$\tan \frac{u}{2} = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

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

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

What you should learn

How to use half-angle formulas to rewrite and evaluate trigonometric functions

IV. Product-to-Sum Formulas (Pages 391–393)

The **product-to-sum formulas** are used in calculus to . . .

The product-to-sum formulas are:

$$\sin u \sin v = \underline{\hspace{2cm}}$$

$$\cos u \cos v = \underline{\hspace{2cm}}$$

$$\sin u \cos v = \underline{\hspace{2cm}}$$

$$\cos u \sin v = \underline{\hspace{2cm}}$$

What you should learn

How to use product-to-sum and sum-to-product formulas to rewrite and evaluate trigonometric functions

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:

$$\sin u + \sin v = \underline{\hspace{10em}}$$

$$\sin u - \sin v = \underline{\hspace{10em}}$$

$$\cos u + \cos v = \underline{\hspace{10em}}$$

$$\cos u - \cos v = \underline{\hspace{10em}}$$

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

Additional notes

Additional notes**Homework Assignment**

Page(s)

Exercises