Math 4 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4-6 Sum and Difference Formulas for Cosine** Date\_\_\_\_\_\_\_\_

*In this activity, you will be working towards the following learning goal:*

*I can, without a calculator, use trigonometric identities such as angle addition/subtraction and double*

*angle formulas, to express values of trigonometric functions in terms of rational numbers and radicals*

I. **Evaluate the following with your calculator to 4 decimal places:** cos 105° ≈ \_\_\_\_\_\_\_\_\_\_

The problem is that this is not an exact value because **cos 105°** is an irrational number.

The following formulas will enable you to calculate the exact value of **cos 105°**.

**Sum and Difference Formulas for Cosine:**

*Note:* are angle measures in either degrees or radians.



/

Here’s how they’re used . . .

1. Think of **cos 105°** as **cos(45° + 60°)**. What is \_\_\_\_ What is \_\_\_\_



2. Use:



3. Substitute:

4. Now it’s *Unit Circle Time, YAAAAAY* . . . . Evaluate and simplify. Combine into one fraction. DO NOT USE YOUR CALCULATOR.



5. *Now use your calculator*. Enter your final fraction from step 4 into your calculator and evaluate. What do you get? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For values, you must use those from the families.



**Example**

*We know, from our knowledge of the unit circle, that . We can use this knowledge to verify the angle addition formula. See below.*

.

Using our angle addition formula with and 



**Now you try. Find the exact values for the following.**

1. ****

2.



**More challenging example: Remember: SOH-CAH-TOA**

**Pythagorean Thm.**



**Given:**



**Find:**

**Prove the following are equal. *Hint: Use formulas and the Unit Circle. Only work on the left side.***

3. **** 4. ****