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

Lesson 4-3: *Sum & Difference Formulas for Cosine* Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 *Happy Unit Circle Time* . . . . Evaluate and simplify. Combine into one fraction.

DO NOT TOUCH YOUR CALCULATOR.

 

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



 *Where do the formulas come from?* **:**



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![MPj03057360000[1]]() . . . to using the formulas: For values, you must use those from the  families.



**II.** **Examples:** *No Calculator!!!!*

**Find the exact values for the following.**

**1.  2.**

**3. Given: Remember: SOH-CAH-TOA**

 **Pythagorean Thm.**

 **Find:**

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

**4.  5. **

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

Homework: Sum & Difference Formulas for Cosine Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 *SHOW ALL WORK. EXACT VALUES ONLY. NO CALCULATOR!!!!*

Simplify the following:

1. = 2. =

3. = 4. 

5.  6. 

7. 

8. Given:

 Find: 

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9. Verify:  10. Verify: 

11. Verify: 



12. a. Using the diagram and information at the right, what

 is the radius of the circle?

 b. Find an expression for *PQ.*

 *\*\*\*Hint: d =* 

 *This is challenging. Show off your algebra skills! ☺*