Student: ____________ **Date:** ____________	**Instructor:** Joe Betters **Course:** Pre-Calculus Pre AP (Master Course)	**Assignment:** 7.5 Classwork (Day 2)

1. Establish the identity.

$$\frac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta}=\cot\alpha\cot\beta-1$$

Choose the sequence of steps below that verifies the identity.

○ **A.** $\frac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta}=\frac{\cos\alpha\cos\beta-\sin\alpha\sin\beta}{\sin\alpha\sin\beta}=\frac{\cos\alpha\cos\beta}{\sin\alpha\sin\beta}-\frac{\sin\alpha\sin\beta}{\sin\alpha\sin\beta}=\cot\alpha\cot\beta-1$

○ **B.** $\frac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta}=\frac{\cos\alpha\cos\beta+\sin\alpha\sin\beta}{\sin\alpha\sin\beta}=\frac{\cos\alpha\cos\beta}{\sin\alpha\sin\beta}+\frac{\sin\alpha\sin\beta}{\sin\alpha\sin\beta}=\cot\alpha\cot\beta-1$

○ **C.** $\frac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta}=\frac{\cos\alpha\cos\beta-\sin\alpha\sin\beta}{\cos\alpha\cos\beta}=\frac{\cos\alpha\cos\beta}{\cos\alpha\cos\beta}-\frac{\sin\alpha\sin\beta}{\cos\alpha\cos\beta}=\cot\alpha\cot\beta-1$

○ **D.** $\frac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta}=\frac{\sin\alpha\sin\beta+\cos\alpha\cos\beta}{\sin\alpha\sin\beta}=\frac{\sin\alpha\sin\beta}{\sin\alpha\sin\beta}+\frac{\cos\alpha\cos\beta}{\sin\alpha\sin\beta}=\cot\alpha\cot\beta-1$

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2. Find the exact value of the expression.

$$\cos\left[\tan^{-1}\frac{12}{5}-\cos^{-1}\frac{8}{17}\right]$$

$\cos\left[\tan^{-1}\frac{12}{5}-\cos^{-1}\frac{8}{17}\right]=$ ____________
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression.)

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3. Solve the equation.

$$\cos\theta-\sqrt{3}\sin\theta=1$$

What is the solution in the interval $0\le\theta<2\pi$? Select the correct choice and fill in any answer boxes in your choice below.

○ **A.** $\theta=\{\quad\}$
(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** There is no solution.

1. A. $\dfrac{\cos(\alpha+\beta)}{\sin\alpha\sin\beta} = \dfrac{\cos\alpha\cos\beta - \sin\alpha\sin\beta}{\sin\alpha\sin\beta} = \dfrac{\cos\alpha\cos\beta}{\sin\alpha\sin\beta} - \dfrac{\sin\alpha\sin\beta}{\sin\alpha\sin\beta} = \cot\alpha\cot\beta - 1$

2. $\dfrac{220}{221}$

3. A. $\theta = \left\{ \boxed{0, \dfrac{4\pi}{3}} \right\}$

(Simplify your answer. Type an exact answer, using π as needed. Type your answer in radians. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

7.5 classwork day 2

① $$\frac{\cos(A+B)}{\sin A \sin B} = \cot A \cot B - 1$$

* use equation

$$\frac{\cos A \cos B - \sin A \sin B}{\sin A \sin B} =$$

* put over common denominator

$$\frac{\cos A \cos B}{\sin A \sin B} - \frac{\sin A \sin B}{\sin A \sin B} =$$

$$\boxed{\cot A \cot B - 1}$$

$\boxed{A}$

7.5 classwork day 2 continued

② $\cos\left[\tan^{-1}\left(\frac{12}{5}\right) - \cos^{-1}\left(\frac{8}{17}\right)\right]$

$\tan A = \frac{12}{5} = \frac{y}{x}$

$x^2 + y^2 = r^2$

$5^2 + 12^2 = r^2$

$r = 13$

$\cos A = \frac{5}{13}$

$\sin A = \frac{12}{13}$

$\cos B = \frac{8}{17} = \frac{x}{r}$

$x^2 + y^2 = r^2$

$8^2 + y^2 = 17^2$

$y = 15$

$\sin B = \frac{15}{17}$

*Formula

$\cos(A - B) = \cos A \cos B + \sin A \sin B$

$= \left(\frac{5}{13}\right)\left(\frac{8}{17}\right) + \left(\frac{12}{13}\right)\left(\frac{15}{17}\right) = \boxed{\frac{220}{221}}$

7.5 classwork day 2 continued

(3) $\cos\theta - \sqrt{3}\sin\theta = 1$

$$\sqrt{1-\sin^2\theta} - \sqrt{3}\sin\theta = 1$$

$$\sqrt{1-\sin^2\theta} = 1 + \sqrt{3}\sin\theta$$

* square both sides *

$$1-\sin^2\theta = 1 + 2\sqrt{3}\sin\theta + 3\sin^2\theta$$

$$0 = 4\sin^2\theta + 2\sqrt{3}\sin\theta$$

$$0 = 2\sin\theta\left(2\sin\theta + \sqrt{3}\right)$$

$\sin\theta = 0$ $\qquad\qquad$ $\sin\theta = -\frac{\sqrt{3}}{2}$

$\theta = \{0, \pi\}$ $\qquad\qquad$ $\theta = \left\{\frac{4\pi}{3}, 5\pi/3\right\}$

$$\boxed{\theta = \{0, 4\pi/3\}}$$

* π and $5\pi/3$ do not work in original equation