

Student: _____

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Date: _____

Course: Pre-Calculus Pre AP (Master Course)

Assignment: 7.6 Classwork Day 1

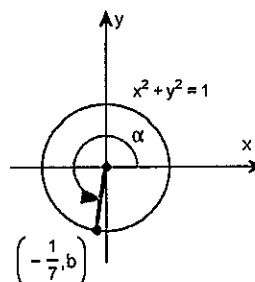
1. Use the half-angle formulas to find the exact value of the trigonometric function $\cos 67.5^\circ$.

$$\cos 67.5^\circ = \underline{\hspace{2cm}}$$

(Type an exact answer, using radicals as needed.)

2. Use the figure to evaluate the function given that $g(x) = \cos x$.

$$g(2\alpha) = \underline{\hspace{2cm}}$$



$$g(2\alpha) = \underline{\hspace{2cm}} \quad (\text{Simplify your answer.})$$

3. Establish the identity.

$$\sec(2\theta) = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

Choose the sequence of steps below that verifies the identity.

A.
$$\sec(2\theta) = \frac{1}{\cos^2\theta - \sin^2\theta} = \frac{1}{\frac{1}{\sec^2\theta} - \frac{1}{\csc^2\theta}} = \frac{1}{\frac{\csc^2\theta - \sec^2\theta}{\sec^2\theta \csc^2\theta}} = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

B.
$$\sec(2\theta) = \frac{1}{2\cos^2\theta - 1} = \frac{1}{\frac{1}{2\sec^2\theta} - 1} = \frac{1}{\frac{1 - 2\sec^2\theta}{2\sec^2\theta}} = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

C.
$$\sec(2\theta) = \frac{1}{\sin^2\theta - \cos^2\theta} = \frac{1}{\frac{1}{\csc^2\theta} - \frac{1}{\sec^2\theta}} = \frac{1}{\frac{\sec^2\theta - \csc^2\theta}{\sec^2\theta \csc^2\theta}} = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

4. Establish the identity.

$$\frac{\sin(15\theta)}{\sin(5\theta)} - \frac{\cos(15\theta)}{\cos(5\theta)} = 2$$

Choose the sequence of steps below that verifies the identity.

- A. $\frac{\sin(15\theta)\sin(5\theta) - \cos(15\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{\cos(15\theta - 5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{2\sin(5\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = 2$
- B. $\frac{\sin(15\theta)\sin(5\theta) - \cos(15\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{\sin(15\theta - 5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{2\sin(5\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = 2$
- C. $\frac{\sin(15\theta)\cos(5\theta) - \cos(15\theta)\sin(5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{\cos(15\theta - 5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{2\sin(5\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = 2$
- D. $\frac{\sin(15\theta)\cos(5\theta) - \cos(15\theta)\sin(5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{\sin(15\theta - 5\theta)}{\sin(5\theta)\cos(5\theta)} = \frac{2\sin(5\theta)\cos(5\theta)}{\sin(5\theta)\cos(5\theta)} = 2$

5. Solve the equation on the interval $0 \leq \theta < 2\pi$.

$$\tan(2\theta) + 2\sin\theta = 0$$

Select the correct choice below and fill in any answer boxes in your choice.

- A. The solution set is $\{\underline{\hspace{2cm}}\}$.
(Use a comma to separate answers as needed. Type an exact answer, using π as needed. Use integers or fractions for any numbers in the expression.)
- B. There is no solution.

$$1. \frac{\sqrt{2-\sqrt{2}}}{2}$$

$$2. -\frac{47}{49}$$

$$3. \text{ A. } \sec(2\theta) = \frac{1}{\cos^2\theta - \sin^2\theta} = \frac{1}{\frac{1}{\sec^2\theta} - \frac{1}{\csc^2\theta}} = \frac{1}{\frac{\csc^2\theta - \sec^2\theta}{\sec^2\theta \csc^2\theta}} = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

$$4. \text{ D. } \frac{\sin(15\theta) \cos(5\theta) - \cos(15\theta) \sin(5\theta)}{\sin(5\theta) \cos(5\theta)} = \frac{\sin(15\theta - 5\theta)}{\sin(5\theta) \cos(5\theta)} = \frac{2 \sin(5\theta) \cos(5\theta)}{\sin(5\theta) \cos(5\theta)} = 2$$

$$5. \text{ A. The solution set is } \left\{ 0, \frac{\pi}{3}, \pi, \frac{5\pi}{3} \right\}.$$

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

7.6 classwork day 1

① $\cos 67.5^\circ$

* half angle

Q1

$$\cos\left(\frac{135}{2}\right) = \pm \sqrt{\frac{1}{2}(1 + \cos 135)}$$

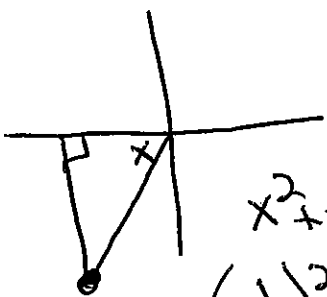
$$= \pm \sqrt{\frac{1}{2}\left(1 + \left(-\frac{\sqrt{2}}{2}\right)\right)}$$

$$= \pm \sqrt{\frac{1}{2} - \frac{\sqrt{2}}{4}} = \pm \frac{\sqrt{2 - \sqrt{2}}}{2}$$

$$= \boxed{\frac{\sqrt{2 - \sqrt{2}}}{2}}$$

7.6 classwork day 1 continued

② $g(x) = \cos x$



$x^2 + y^2 = 1$
 $(-\frac{1}{7}, b)$
 $(-\frac{1}{7})^2 + (b)^2 = 1$
 $b^2 = \frac{48}{49}$

$$b = \pm \frac{4\sqrt{3}}{7}$$

$$Q3 \rightarrow -\frac{4\sqrt{3}}{7}$$

$$\cos x = -\frac{1}{7}$$

$$\sin x = -\frac{4\sqrt{3}}{7}$$

* Formula $g(2x)$

$$= \cos^2 x - \sin^2 x$$

$$\left(-\frac{1}{7}\right)^2 - \left(-\frac{4\sqrt{3}}{7}\right)^2$$

$$= \boxed{-\frac{47}{49}}$$

7.6 classwork day 1 continued

$$\textcircled{3} \quad \sec(2\theta) = \frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}$$

* use left side

$$\sec 2\theta =$$

$$\frac{1}{\cos 2\theta} =$$

$$\frac{1}{\cos^2\theta - \sin^2\theta} =$$

* use formula for double angle

$$\frac{1}{\frac{1}{\sec^2\theta} - \frac{1}{\csc^2\theta}} =$$

$$* \cos\theta = \frac{1}{\sec\theta}$$

$$* \sin\theta = \frac{1}{\csc\theta}$$

$$\frac{1}{\frac{\csc^2\theta - \sec^2\theta}{\sec^2\theta \csc^2\theta}} =$$

common denominator

$$\boxed{\frac{\sec^2\theta \csc^2\theta}{\csc^2\theta - \sec^2\theta}}$$

A

7.6 classwork day 1 continued

$$(5) \quad \tan(2\theta) + 2\sin\theta = 0$$

$$\frac{\sin(2\theta)}{\cos(2\theta)} + 2\sin\theta = 0$$

$$\frac{2\sin\theta\cos\theta}{\cos(2\theta)} + \frac{2\sin\theta\cos(2\theta)}{\cos(2\theta)} = 0$$

$$\frac{2\sin\theta\cos\theta + 2\sin\theta(2\cos^2\theta - 1)}{\cos(2\theta)} = 0$$

$$2\sin\theta(2\cos^2\theta + \cos\theta - 1) = 0$$

$$2\sin\theta(2\cos\theta - 1)(\cos\theta + 1) = 0$$

$$2\sin\theta = 0$$

$$\sin\theta = 0$$

$$\theta = \{0, \pi\}$$

$$2\cos\theta - 1 = 0$$

$$\cos\theta = \frac{1}{2}$$

$$\theta = \left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$$

$$\cos\theta + 1 = 0$$

$$\cos\theta = -1$$

$$\theta = \pi$$

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