

Precalc
Rev for Ch. 7 Test

Chapter 7 IDENTITIES

Name _____
Per. _____

Reciprocal Identities

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

$$\cot \theta = \frac{1}{\tan \theta}$$

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

Negative Identities

$$\sin(-\theta) = -\sin \theta$$

$$\cos(-\theta) = \cos \theta$$

$$\tan(-\theta) = -\tan \theta$$

Quotient Identities

$$\tan \theta = \frac{1}{\cot \theta}$$

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

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

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

Pythagorean Identities (and rearrange them!)

$$\cos^2 \theta + \sin^2 \theta = 1$$

$$\tan^2 \theta + 1 = \sec^2 \theta$$

$$\cot^2 \theta + 1 = \csc^2 \theta$$

Sum Identities

$$\sin(\alpha + \theta) = \sin \alpha \cos \theta + \cos \alpha \sin \theta$$

$$\cos(\alpha + \theta) = \cos \alpha \cos \theta - \sin \alpha \sin \theta$$

$$\tan(\alpha + \theta) = \frac{\tan \alpha + \tan \theta}{1 - \tan \alpha \tan \theta}$$

Difference Identities

$$\sin(\alpha - \theta) = \sin \alpha \cos \theta - \cos \alpha \sin \theta$$

$$\cos(\alpha - \theta) = \cos \alpha \cos \theta + \sin \alpha \sin \theta$$

$$\tan(\alpha - \theta) = \frac{\tan \alpha - \tan \theta}{1 + \tan \alpha \tan \theta}$$

Double-Angle Identities

$$\sin 2\theta = 2 \sin \theta \cos \theta$$

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

$$\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$$

$$\cos 2\theta = 1 - 2 \sin^2 \theta$$

$$\tan 2\theta = \frac{\sin 2\theta}{\cos 2\theta}$$

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

Half-Angle Identities

$$\sin\left(\frac{\theta}{2}\right) = \pm \sqrt{\frac{1 - \cos \theta}{2}}$$

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

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

$$\tan\left(\frac{\theta}{2}\right) = \frac{\sin \theta}{1 + \cos \theta}$$

$$\tan\left(\frac{\theta}{2}\right) = \frac{\sin\left(\frac{\theta}{2}\right)}{\cos\left(\frac{\theta}{2}\right)}$$

$$\tan\left(\frac{\theta}{2}\right) = \frac{1 - \cos \theta}{\sin \theta}$$

Co-function Identities (complementary angles!)

$$\sin(90^\circ - \theta) = \cos \theta$$

$$\cos(90^\circ - \theta) = \sin \theta$$

$$\tan(90^\circ - \theta) = \cot \theta$$

$$\csc(90^\circ - \theta) = \sec \theta$$

$$\sec(90^\circ - \theta) = \csc \theta$$

$$\cot(90^\circ - \theta) = \tan \theta$$

Name: _____

Verifying Trig Identities Practice

Verify each trig identity.

1. $\cos(x) + \sin(x) \tan(x) = \sec(x)$

2. $\frac{1}{\sec(x) \tan(x)} = \csc(x) - \sin(x)$

3. $\frac{1+\sin(x)}{\cos(x)} + \frac{\cos(x)}{1+\sin(x)} = 2 \sec(x)$

4. $\frac{\sec x \sin x}{\tan x + \cot x} = \sin^2 x$

5. $\frac{\sin(x)\sec(x)}{\cos^2(x)} = \tan x \sec^2 x$

Name: _____

Using Sum and Difference Formulas Practice

Find the exact value of each.

1. $\cos 75^\circ$

2. $\sin \frac{\pi}{12}$

3. $\sin(135^\circ - 30^\circ)$

4. $\sin 42^\circ \cos 12^\circ - \cos 42^\circ \sin 12^\circ$

5. $\cos 25^\circ \cos 20^\circ - \sin 25^\circ \sin 20^\circ$

6. $\sin 15^\circ$

7. $\tan 15^\circ$

8. $\cos \frac{\pi}{4} + \cos \frac{\pi}{3}$

9. $\tan \frac{13\pi}{12}$

10. $\sin\left(\frac{3\pi}{4} + \frac{5\pi}{6}\right)$

Name: _____

Rewriting Expressions Using Half-Angle Formulas Practice

Find the exact values.

1. $\sin 105^\circ$

2. $\cos 75^\circ$

3. $\tan 165^\circ$

4. $\sin \frac{\pi}{8}$

5. $\tan \frac{\pi}{12}$

6. $\cos \frac{3\pi}{8}$

7. $\tan 75^\circ$

8. $\cos \frac{7\pi}{12}$

9. $\sin 165^\circ$

Assignment

Find the exact value of each.

1) $\tan \theta = \frac{4\sqrt{21}}{5}$ where $0 \leq \theta < 90$

Find $\cos 2\theta$

2) $\tan \theta = \frac{12}{5}$ where $0 \leq \theta < 90$

Find $\sin 2\theta$

3) $\cos \theta = -\frac{8}{17}$ where $180 \leq \theta < 270$

Find $\tan 2\theta$

4) $\tan \theta = \frac{4}{3}$ where $0 \leq \theta < 90$

Find $\sin 2\theta$

5) $\tan \theta = \frac{12}{5}$ where $180 \leq \theta < 270$

Find $\tan \frac{\theta}{2}$

6) $\cos \theta = \frac{3}{5}$ where $270 \leq \theta < 360$

Find $\tan \frac{\theta}{2}$

7) $\cos \theta = \frac{3}{5}$ where $270 \leq \theta < 360$

Find $\cos \frac{\theta}{2}$

8) $\sin \theta = -\frac{12}{13}$ where $270 \leq \theta < 360$

Find $\sin \frac{\theta}{2}$

Find the exact value of each expression. (Inverses)

9) $\sec\left(\sin^{-1} \frac{1}{5}\right)$

10) $\cot\left(\tan^{-1} \frac{3\sqrt{23}}{7}\right)$

11) $\sin\left(\tan^{-1} \frac{2\sqrt{21}}{21}\right)$

12) $\sin^{-1}(\cos \pi)$

$$13) \tan^{-1}(\cos 0)$$

$$14) \cot(\tan^{-1} 1)$$

Verify each identity.

$$15) \sec^2 x + \csc^2 x = \frac{\csc^2 x}{\cos^2 x}$$

$$16) \frac{\csc^2 x}{\tan x + \cot x} = \frac{1}{\tan x}$$

Assignment

Solve each equation for $0 \leq \theta < 360$.

1) $3\sin^2 2\theta = \sin^2 \theta + 2\sin^2 \theta$

2) $\sin^2 2\theta - 3\cos^2 \theta = 0$

3) $\cos \theta = \cos 2\theta$

4) $4\sin^2 \theta + \sin^2 2\theta = 2\sin^2 2\theta$

Name: _____

Solving Multiple Angle Equations Practice

Solve. ($0 \leq x < 2\pi$ Domain)

1. $2 \cos x + \sin 2x = 0$

2. $\tan 2x - 2 \cos x = 0$

3. $\sin 2x - \sin x = 0$

4. $\cos 2x - \cos x = 0$

Use double angle formulas to rewrite the expression.

5. $6 \sin x \cos x$

7. $6 \cos^2 x - 3$

8. $4 - 8 \sin^2 x$

Solve each equation for General Case Radians!

5) $-4 + \tan^2 X = 2 \tan X - 5$

6) $\cot^2 X - 3 \csc X = -3$



7) $-\csc X = \sqrt{3} \csc X - 3 \csc X \cot X - \csc X$

8) $2 - \sec X - 2 \sec^2 X = -\sec^2 X$

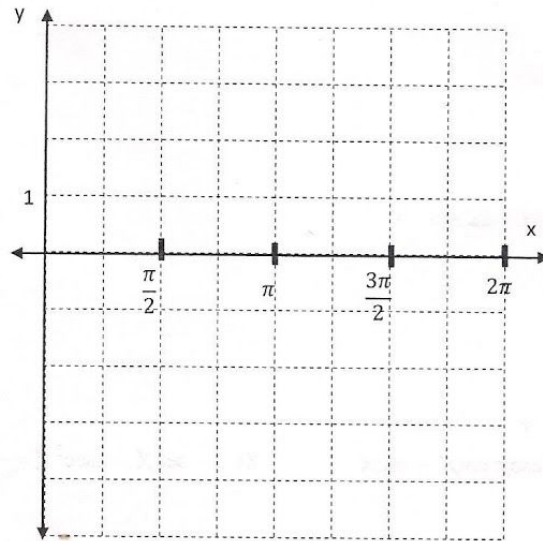
Part 1: Graphing Calculators and/or Scientific Calculators!

1. Solve the given problem using a graphing calculator.

Use the 2nd calc feature of the graphing calculator to find the intersection of two equations.

Draw a sketch emphasizing the intersections for $0 \leq x < 2\pi$ and write the values of the x-coordinates to the accuracy of 4 places past the decimal point.

$$4 \cos(2x) = x$$



Actual equations entered:

$Y_1 =$ _____ $Y_2 =$ _____

Graphical solutions: $x =$ _____

Please make sure your Calculator is in degree mode. Scientific Calc or Graphing Calc.

2. Solve for θ , if $0 \leq \theta < 360^\circ$, use calculator and find all answers to the nearest tenth of a degree.

$$3 \sin^2 \theta - 7 \sin \theta + 2 = 0$$

2. _____