Name: Key

Verifying Trig Identities Practice

Verify each trig identity.

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

$$\frac{(\cos x)}{(\cos x)}\cdot\frac{\cos x}{1} + \sin x \cdot \frac{\sin x}{\cos x}$$

$$\frac{\cos^2 x}{\cos x} + \frac{\sin^2 x}{\cos x} =$$

$$\frac{\cos^2 x + \sin^2 x}{\cos x} =$$

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

$$\sec x = \sec x \checkmark$$

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

$$= \frac{1}{\sin x} - \frac{\sin x}{1}\cdot\frac{(\sin x)}{(\sin x)}$$

$$= \frac{1}{\sin x} - \frac{\sin^2 x}{\sin x}$$

$$= \frac{1-\sin^2 x}{\sin x}$$

$$= \frac{\cos^2 x}{\sin x}$$

$$= \cos x \cdot \frac{\cos x}{\sin x}$$

$$\frac{1}{\sec x \tan x} = \frac{1}{\sec x \tan x} \checkmark \quad \frac{1}{\sec x}\cdot\frac{\cos x}{1}$$

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

$$\frac{(1+\sin x)}{(1+\sin x)}\cdot\frac{1+\sin x}{\cos x} + \frac{\cos x}{1+\sin x}\cdot\frac{(\cos x)}{(\cos x)}$$

$$\frac{1+2\sin x+\sin^2 x}{\cos x(1+\sin x)} + \frac{\cos^2 x}{\cos x(1+\sin x)} =$$

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

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

$$\frac{2\cancel{(1+\sin x)}}{\cos x\cancel{(1+\sin x)}} =$$

$$2\sec x = 2\sec x \checkmark$$

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

$$\frac{(\cos x \sin x)\,\frac{1}{\cos x}\cdot \sin x}{(\cos x \sin x)\left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}\right)} =$$

$$\frac{\sin x \cdot \sin x}{\sin^2 x + \cos^2 x} =$$

$$\frac{\sin^2 x}{1} =$$

$$\sin^2 x = \sin^2 x \checkmark$$

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

$$\frac{\sin x}{\cos^2 x \cos x} =$$

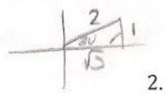
$$\frac{\sin x}{\cos x}\cdot\frac{1}{\cos^2 x} =$$

$$\tan x \cdot \sec^2 x = \tan x \sec^2 x \checkmark$$

Name: Key

Using Sum and Difference Formulas Practice

Find the exact value of each.



1. $\cos 75°$

$\cos(45° + 30°) =$

$\cos 45° \cos 30° - \sin 45° \sin 30°$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

2. $\sin \frac{\pi}{12}$ 15°

$\sin(45° - 30°)$

$\sin\left(\frac{\pi}{4} - \frac{\pi}{6}\right)$

$\sin \frac{\pi}{4} \cos \frac{\pi}{6} - \cos \frac{\pi}{4} \sin \frac{\pi}{6}$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} = \frac{\sqrt{6}-\sqrt{2}}{4}$

3. $\sin(135° - 30°)$ 105°

$\sin 135° \cos 30° - \cos 135° \sin 30°$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \left(\frac{-\sqrt{2}}{2} \cdot \frac{1}{2}\right)$

$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$

$\frac{\sqrt{6}+\sqrt{2}}{4}$

4. $\sin 42° \cos 12° - \cos 42° \sin 12°$

$\sin(42° - 12°) = \sin 30°$

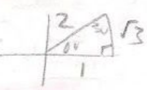
$= \frac{1}{2}$

5. $\cos 25° \cos 20° - \sin 25° \sin 20°$

$\cos(25° + 20°)$

$\cos 45° = \frac{\sqrt{2}}{2}$

$\tan 30° = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$



6. $\sin 15°$

$\sin(45° - 30°)$

$\sin 45 \cos 30 - \cos 45 \sin 30$

$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$

$\boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$

7. $\tan 15°$

$\tan(45° - 30°)$

$\frac{\tan 45° - \tan 30°}{1 + \tan 45° \tan 30°}$

$\frac{(3)\ 1 - \frac{\sqrt{3}}{3}\ (3)}{(3)\ 1 + (1)\left(\frac{\sqrt{3}}{3}\right)(3)} = \frac{3-\sqrt{3}\,(3-\sqrt{3})}{3+\sqrt{3}\,(3-\sqrt{3})}$

$= \frac{9 - 6\sqrt{3} + 3}{9-3} = \frac{12 - 6\sqrt{3}}{6} = \boxed{2-\sqrt{3}}$

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

$\frac{\sqrt{2}}{2} + \frac{1}{2}$

$\boxed{\frac{\sqrt{2}+1}{2}}$

9. $\tan \frac{13\pi}{12}$ 195°

$\tan(150° + 45°)$

$\frac{\tan 150° + \tan 45°}{1 - \tan 150° \tan 45°}$

$\frac{-\frac{\sqrt{3}}{3}(3) + 1\ (3)}{(3)\ 1 - \left(-\frac{\sqrt{3}}{3}\right)(1)(3)} = \frac{-\sqrt{3} + 3\,(3-\sqrt{3})}{3+\sqrt{3}\,(3-\sqrt{3})}$

$= \frac{9+3-6\sqrt{3}}{9-3}$

$\frac{12-6\sqrt{3}}{6} = 2-\sqrt{3}$

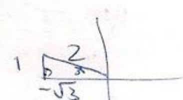
10. $\sin\left(\frac{3\pi}{4} + \frac{5\pi}{6}\right)$

$\sin\frac{3\pi}{4}\cos\frac{5\pi}{6} + \cos\frac{3\pi}{4}\sin\frac{5\pi}{6}$

$\left(\frac{\sqrt{2}}{2}\right)\left(-\frac{\sqrt{3}}{2}\right) + \left(-\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$

$-\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4}$

$\frac{-\sqrt{6}-\sqrt{2}}{4}$



Name: Key

Rewriting Expressions Using Half-Angle Formulas Practice

Find the exact values.

1. $\sin 105°$ Quad 2 $+$

$\sin\left(\frac{210°}{2}\right) = +\sqrt{\frac{1-\cos 210°}{2}}$

$= \sqrt{\frac{1 - -\frac{\sqrt{3}}{2}}{2}}$

$= \sqrt{\frac{(2)\,1+\frac{\sqrt{3}}{2}\,(2)}{2(2)}} = \sqrt{\frac{2+\sqrt{3}}{4}}$

$= \boxed{\frac{\sqrt{2+\sqrt{3}}}{2}}$

2. $\cos 75°$ Quad 1 $+$

$\cos\left(\frac{150°}{2}\right) = +\sqrt{\frac{1+\cos 150°}{2}}$

$= \sqrt{\frac{(2)\,1+ -\frac{\sqrt{3}}{2}\,(2)}{2(2)}}$

$= \sqrt{\frac{2-\sqrt{3}}{4}}$

$= \boxed{\frac{\sqrt{2-\sqrt{3}}}{2}}$

3. $\tan 165°$ Quad 2

$\tan\left(\frac{330}{2}\right) = \frac{\sin\theta}{1+\cos\theta}$

$= \frac{\sin 330°}{1+\cos 330°}$

$= \frac{(2)\,-\frac{1}{2}\,(2)}{(2)\,1+\frac{\sqrt{3}}{2}\,(2)}$

$= \frac{-1}{2+\sqrt{3}}\frac{(2-\sqrt{3})}{(2-\sqrt{3})}$

$= \frac{-2+\sqrt{3}}{4-3}$

$= \boxed{-2+\sqrt{3}}$

4. $\sin\frac{\pi}{8}$ $22.5°$ Quad 1 $+$

$\sin\frac{45°}{2} = +\sqrt{\frac{1-\cos 45°}{2}}$

$= +\sqrt{\frac{(2)\,1-\frac{\sqrt{2}}{2}\,(2)}{2(2)}}$

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

5. $\tan\frac{\pi}{12}$ $15°$

$\tan\frac{30°}{2} = \frac{\sin 30°}{1+\cos 30°}$

$= \frac{(2)\,\frac{1}{2}\,(2)}{(2)\,1+\frac{\sqrt{3}}{2}\,(2)}$

$= \frac{1}{2+\sqrt{3}}\frac{(2-\sqrt{3})}{(2-\sqrt{3})}$

$= \frac{2-\sqrt{3}}{4-3} = \boxed{2-\sqrt{3}}$

6. $\cos\frac{3\pi}{8}$ $67.5°$ Quad 1 $+$

$\cos\frac{135°}{2} =$

$= +\sqrt{\frac{1+\cos 135°}{2}}$

$= +\sqrt{\frac{(2)\,1+ -\frac{\sqrt{2}}{2}\,(2)}{2(2)}}$

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

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

7. $\tan 75°$

$\tan\frac{150°}{2} = \frac{\sin 150°}{1+\cos 150°}$

$= \frac{(2)\,\frac{1}{2}\,(2)}{(2)\,1+ -\frac{\sqrt{3}}{2}\,(2)}$

$= \frac{1}{2-\sqrt{3}}\frac{(2+\sqrt{3})}{(2+\sqrt{3})}$

$= \frac{2+\sqrt{3}}{4-3} = \boxed{2+\sqrt{3}}$

8. $\cos\frac{7\pi}{12}$ $105°$ Quad 2 $-$

$\cos\frac{210°}{2} = -\sqrt{\frac{1+\cos 210°}{2}}$

$= -\sqrt{\frac{(2)\,1+ -\frac{\sqrt{3}}{2}\,(2)}{2(2)}}$

$= -\sqrt{\frac{2-\sqrt{3}}{4}}$

$= \boxed{\frac{-\sqrt{2-\sqrt{3}}}{2}}$

9. $\sin 165°$ Quad 2 $+$

$\sin\frac{330}{2} = +\sqrt{\frac{1-\cos 330}{2}}$

$= +\sqrt{\frac{(2)\,1-\frac{\sqrt{3}}{2}\,(2)}{2(2)}}$

$= +\sqrt{\frac{2-\sqrt{3}}{4}}$

$= \boxed{+\frac{\sqrt{2-\sqrt{3}}}{2}}$

Precalculus Name____________________ ID: 1

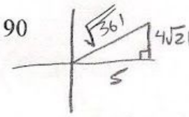
Assignment

Date____________ Period____

Find the exact value of each.

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

Find $\cos 2\theta$



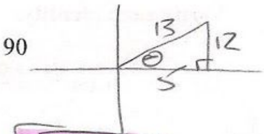
$\cos 2\theta = \cos^2\theta - \sin^2\theta$

$\left(\frac{5}{\sqrt{361}}\right)^2 - \left(\frac{4\sqrt{21}}{361}\right)^2$

$\frac{25}{361} - \frac{336}{361} = \frac{-311}{361}$

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

Find $\sin 2\theta$

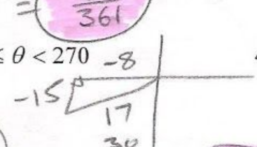


$\sin 2\theta = 2\sin\theta\cos\theta$

$= 2\left(\frac{12}{13}\right)\left(\frac{5}{13}\right) = \boxed{\frac{120}{169}}$

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

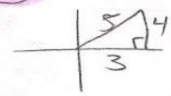
Find $\tan 2\theta$



$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta} = \frac{2\left(\frac{15}{8}\right)}{1-\left(\frac{15}{8}\right)^2} = \frac{\frac{30}{8}}{\frac{-161}{64}} = \boxed{\frac{-240}{161}}$

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

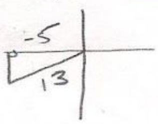
Find $\sin 2\theta$ $= 2\sin\theta\cos\theta$



$2\left(\frac{4}{5}\right)\left(\frac{3}{5}\right) = \boxed{\frac{24}{25}}$

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

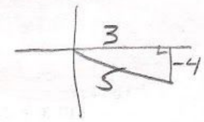
Find $\tan\frac{\theta}{2} = \frac{\sin\theta}{1+\cos\theta}$



$= \frac{\frac{-12}{13}(13)}{(13)\,1+\frac{-5}{13}(13)} = \frac{-12}{13-5} = \frac{-12}{8} = \boxed{\frac{-3}{2}}$

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

Find $\tan\frac{\theta}{2} = \frac{\sin\theta}{1+\cos\theta}$

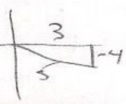


$= \frac{\frac{-4}{5}(5)}{(5)\,1+\frac{3}{5}(5)} = \frac{-4}{5+3} = \frac{-4}{8} = \boxed{\frac{-1}{2}}$

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

$135 < \frac{\theta}{2} < 180$ Quad 2 (−)

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



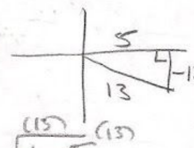
$-\sqrt{\frac{1+\cos\theta}{2}} = -\sqrt{\frac{1+\frac{3}{5}(5)}{2(5)}}$

$= -\sqrt{\frac{5+3}{10}} = -\sqrt{\frac{8}{10}} = -\sqrt{\frac{4}{5}} = \frac{-2}{\sqrt{5}}\frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{-2\sqrt{5}}{5}}$

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

$135 \le \frac{\theta}{2} < 180$ Quad 2

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



$+\sqrt{\frac{1-\cos\theta}{2}} = +\sqrt{\frac{(13)\,1-\frac{5}{13}(13)}{2(13)}}$

$= \sqrt{\frac{13-5}{26}} = \sqrt{\frac{8}{26}} = \sqrt{\frac{4}{13}} = \frac{2}{\sqrt{13}}\frac{\sqrt{13}}{\sqrt{13}}$

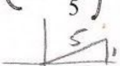
$\boxed{\frac{2\sqrt{13}}{13}}$

Find the exact value of each expression. (Inverses)

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

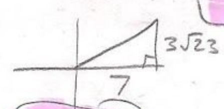
$\sqrt{24}$ $4 \cdot 6$

$\sqrt{24}$



$= \frac{5}{2\sqrt{6}}\frac{\sqrt{6}}{\sqrt{6}} = \boxed{\frac{5\sqrt{6}}{12}}$

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

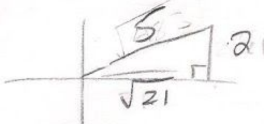


$\frac{7}{3\sqrt{23}}\frac{\sqrt{23}}{\sqrt{23}} = \boxed{\frac{7\sqrt{23}}{69}}$

$\sqrt{483}$

$3 \cdot 161$

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

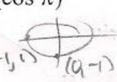


$\cancel{\frac{2\sqrt{21}}{\sqrt{483}}}$ $\frac{2}{\sqrt{21}}$

$\boxed{\frac{2}{5}}$

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

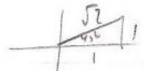
$\sin^{-1}(-1)$



restrictions!

$\cancel{\frac{3\pi}{2}}$ $\boxed{\frac{-\pi}{2}}$

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



(1,0)

$\tan^{-1}(1) = \boxed{\frac{\pi}{4}}$

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

$\cot\left(\frac{\pi}{4}\right) = \boxed{1}$

Verify each identity.

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

$\dfrac{\sin^2 x}{\sin^2 x}\dfrac{1}{\cos^2 x} + \dfrac{1}{\sin^2 x}\dfrac{\cos^2 x}{\cos^2 x}$

$\dfrac{\sin^2 x}{\cos^2 x \sin^2 x} + \dfrac{\cos^2 x}{\sin^2 \cos^2 x} =$

$\dfrac{1}{\cos^2 x \sin^2 x} =$

$\dfrac{\csc^2 x}{\cos^2 x} = \dfrac{\csc^2}{\cos^2 x}$ ✓

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

$\dfrac{\dfrac{1}{\sin^2 x}\,\sin^2 x\cos x}{\dfrac{\sin x}{\cos x}\,\sin^2 x\cos x + \dfrac{\cos x}{\sin x}\,\sin^2 x\cos x} =$

$\dfrac{\cos x}{\sin^3 x + \cos^2 x \sin x} =$

$\dfrac{\cos x}{\sin x(\sin^2 x + \cos^2 x)} =$

$\dfrac{\cos x}{\sin x} =$

$\cot x =$

$\dfrac{1}{\tan x} = \dfrac{1}{\tan x}$ ✓

Precalculus — Name: Key — ID: 1

Assignment

Date________________ Period____

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

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

$3((2\sin\theta\cos\theta)^2) = \sin^2\theta + 2((2\sin\theta\cos\theta)^2)$

$3(4\sin^2\theta\cos^2\theta) = \sin^2\theta + 2(4\sin^2\theta\cos^2\theta)$

$12\sin^2\theta\cos^2\theta = \sin^2\theta + 8\sin^2\theta\cos^2\theta$

$4\sin^2\theta\cos^2\theta - \sin^2\theta = 0$

$\sin^2\theta(4\cos^2\theta - 1) = 0$

$\sqrt{\sin^2\theta} = \sqrt{0}$ $\qquad$ $4\cos^2\theta - 1 = 0$

$\sin\theta = 0$ $\qquad$ $\sqrt{\cos^2\theta} = \sqrt{\tfrac{1}{4}}$

$\cos\theta = \pm\tfrac{1}{2}$

(-1,0) (1,0)

$\boxed{\theta = 0°, 180°}$ $\qquad$ $\boxed{\theta = 60°, 120°, 240°, 300°}$

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

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

$4\sin^2\theta\cos^2\theta - 3\cos^2\theta = 0$

$\cos^2\theta(4\sin^2\theta - 3) = 0$

$\cos^2\theta = 0$ $\qquad$ $\sqrt{\sin^2\theta} = \sqrt{\tfrac{3}{4}}$

$\sin\theta = \pm\frac{\sqrt{3}}{2}$

(0,1) (0,-1)

$\theta = 90°, 270°$ $\qquad$ $\theta = 60°, 120°, 240°, 300°$

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

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

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

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

$2\cos\theta + 1 = 0$ $\qquad$ $\cos\theta = 1$

$\cos\theta = -\tfrac{1}{2}$ $\qquad$ $\boxed{\theta = 0°}$

$\theta = 120°$
$\theta = 240°$

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

$0 = -4\sin^2\theta + \sin^2 2\theta$

$0 = -4\sin^2\theta + (2\sin\theta\cos\theta)^2$

$0 = -4\sin^2\theta + 4\sin^2\theta\cos^2\theta$

$0 = -4\sin^2\theta(1 - \cos^2\theta)$

$-4\sin^2\theta = 0$ $\qquad$ $1 - \cos^2\theta = 0$

$\sin^2\theta = 0$ $\qquad$ $\sqrt{\cos^2\theta} = \sqrt{1}$

$\sin\theta = 0$ $\qquad$ $\cos\theta = \pm 1$

(-1,0) (1,0) $\qquad$ (-1,0) (1,0) same

$\theta = 0°, 180°$

Name: Key

Solving Multiple Angle Equations Practice

Solve. $(0 \le x < 2\pi \text{ Domain})$

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

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

$2\cos x(1 + 1\sin x) = 0$

$2\cos x = 0$ (or) $1 + 1\sin x = 0$

$\cos x = 0$ $\quad \sin x = -1$

(0,−1)

same

$x = \frac{3\pi}{2}$

$x = \pi/2, \frac{3\pi}{2}$

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

$\frac{\sin 2x}{\cos 2x} = \frac{2\cos x}{1}$

$\sin 2x = 2\cos x \cdot \cos 2x$

$2\sin x\cos x = 2\cos x(1 - 2\sin^2 x)$

$2\sin x\cos x = 2\cos x - 4\cos x\sin^2 x$

$4\cos x\sin^2 x + 2\sin x\cos x - 2\cos x = 0$

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

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

$\sin x = \frac{1}{2}$ $\quad x = \pi/6, \frac{5\pi}{6}$

$\cos x = 0$ $\quad x = \frac{\pi}{2}, \frac{3\pi}{2}$

$\sin x = -1$ $\quad x = \frac{3\pi}{2}$

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

$2\sin x\cos x - \sin x = 0$

$\sin x(2\cos x - 1) = 0$

$\sin x = 0$ $\quad \cos x = \frac{1}{2}$

(−1,0) (1,0)

$x = 0, \pi$ $\quad x = \pi/3, 5\pi/3$

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

$2\cos^2 x - 1 - \cos x = 0$

$2\cos^2 x - \cos x - 1 = 0$

$(2\cos x + 1)(\cos x - 1) = 0$

$\cos x = -\frac{1}{2}$ $\quad \cos x - 1 = 0$

$\cos x = 1$

(1,0)

$x = \frac{2\pi}{3}, \frac{4\pi}{3}$

$x = 0$

Use double angle formulas to rewrite the expression.

5. $6\sin x\cos x$

$3(2\sin x\cos x)$

$3\sin 2x$

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

$3(2\cos^2 x - 1)$

$3(\cos 2x)$

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

$4(1 - 2\sin^2 x)$

$4\sin 2x$

Solve each equation for {General Case} Radians!

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

$\tan^2 x - 2\tan x + 1 = 0$

$(\tan x - 1)(\tan x - 1) = 0$

$\tan x = 1$

$x = \frac{\pi}{4}, \frac{5\pi}{4}$

$\boxed{x = \frac{\pi}{4} + \pi k}$

simplified

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

$\cancel{\sin^2 x}\ \frac{\cos^2 x}{\cancel{\sin^2 x}} - \frac{3}{\sin x} = -3\ \sin^2 x$

$\cos^2 x - 3\sin x = -3\sin^2 x$

$(1 - \sin^2 x) - 3\sin x = -3\sin^2 x$

$1 - \sin^2 x - 3\sin x + 3\sin^2 x = 0$

$2\sin^2 x - 3\sin x + 1 = 0$

$(2\sin x - 1)(\sin x - 1) = 0$

$\sin x = \frac{1}{2}$ $\qquad$ $\sin x = 1$ $\quad$ (0,1)

$x = \pi/2$

$x = \pi/6$

$x = 5\pi/6$

$\boxed{\begin{aligned} x &= \frac{\pi}{2} + 2\pi k \\ x &= \frac{\pi}{6} + 2\pi k \\ x &= \frac{5\pi}{6} + 2\pi k \end{aligned}}$

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

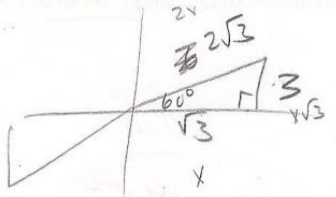
$0 = \sqrt{3}\csc x - 3\csc x \cot x$

$0 = \csc x(\sqrt{3} - 3\cot x)$

$\cancel{\csc x = 0}$ $\qquad$ $\sqrt{3} - 3\cot x = 0$

none $\qquad$ $-3\cot x = -\sqrt{3}$

$\frac{\cos}{\sin}$ $\quad \cot x = \frac{\sqrt{3}}{3}$



$\boxed{x = \frac{\pi}{3} + \pi k}$

simplified

$x = \frac{\pi}{3}$ $\qquad$ $x = \frac{4\pi}{3}$

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

$0 = \sec^2 x + \sec x - 2$

$0 = (\sec x - 1)(\sec x + 2)$

$\sec x = 1$ $\qquad$ $\sec x = -2$

$\frac{1}{\cos x} = 1$ $\qquad$ $\cos\theta = \frac{-1}{2}$

$\cos x = 1$

(1,0)

$x = 0$ $\qquad$ $x = \frac{2\pi}{3}$

$x = \frac{4\pi}{3}$

$\boxed{\begin{aligned} x &= 0 + 2\pi k \\ x &= \frac{2\pi}{3} + 2\pi k \\ x &= \frac{4\pi}{3} + 2\pi k \end{aligned}}$

TPC Chapter 7

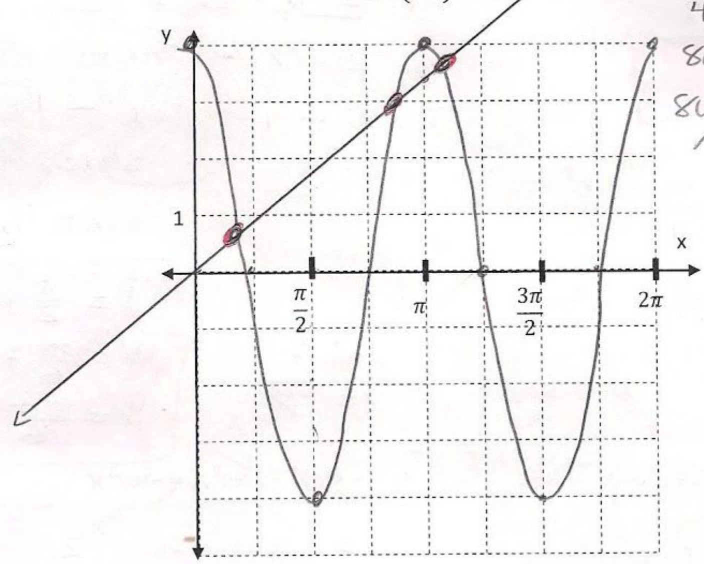
Name: Key

Per: ________

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 $0 \le x < 2\pi$ and write the values of the x-coordinates to the accuracy of 4 places past the decimal point.

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



~~$4(2\cos^2 x - 1) - x = 0$~~

~~$8\cos^2 x - 4 - x = 0$~~

~~$8\cos^2 x$~~ no! algebraically

Actual equations entered:

Y_1 = 4cos 2X Y_2 = X

Graphical solutions: x = .6977 X = 2.7322 X = 3.4153

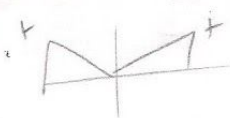
Please make sure your Calculator is in degree mode. Scientific Calc or Graphing Calc.

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

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

$(3\sin\theta - 1)(\sin\theta - 2) = 0$

$\sin\theta = \frac{1}{3}$ $\cancel{\sin\theta = 2}$



2. $\theta = 19.5^\circ$

$\theta = 160.5^\circ$