Name: Key

Date: _____

Chapter 5.1-5.3 Review Part 2

Verify the identities. You may only work with <u>one</u> side of the identity.

1. $(\csc x - \cot x)^2 = \dfrac{1-\cos x}{1+\cos x}$ $\quad \dfrac{1-\cos x}{1-\cos x}$

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

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

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

$\csc^2 x - 2\csc x\cot x + \cot^2 x$

$(\csc x - \cot x)^2$

2. $\cos\theta\cot\theta = \csc\theta - \sin\theta$

$\dfrac{1}{\sin\theta} - \dfrac{\sin\theta}{1}\cdot\dfrac{\sin\theta}{\sin\theta}$

$\dfrac{1-\sin^2\theta}{\sin\theta}$

$\dfrac{\cos^2\theta}{\sin\theta}$

$\dfrac{\cos\theta}{\sin\theta}\cdot\cos\theta$

$\cos\theta\cot\theta$

3. $\sin x + \cos x = \dfrac{\cos x}{1-\tan x} + \dfrac{\sin x}{1-\cot x}$

$\dfrac{\cos x}{\cos x}\cdot\dfrac{\cos x}{1-\dfrac{\sin x}{\cos x}} + \dfrac{\sin x}{\sin x}\cdot\dfrac{\sin x}{1-\dfrac{\cos x}{\sin x}}$

$\dfrac{\cos x}{\dfrac{\cos x-\sin x}{\cos x}} + \dfrac{\sin x}{\dfrac{\sin x-\cos x}{\sin x}}$

$\dfrac{\cos^2 x}{\cos x-\sin x} + \dfrac{\sin^2 x}{\sin x-\cos x}\cdot\dfrac{(-1)}{(-1)}$

$\dfrac{\cos^2 x}{\cos x-\sin x} - \dfrac{\sin^2 x}{\cos x-\sin x}$

$\dfrac{\cos^2 x-\sin^2 x}{\cos x-\sin x}$

$\dfrac{(\cos x-\sin x)(\cos x+\sin x)}{\cos x-\sin x}$

$\cos x+\sin x$

4. $\sin\theta+\cos\theta+\tan\theta\sin\theta = \sec\theta+\cos\theta\tan\theta$

$\sin\theta+\cos\theta+\dfrac{\sin\theta}{\cos\theta}\cdot\dfrac{\sin\theta}{1}$

$\sin\theta+\cos\theta+\dfrac{\sin^2\theta}{\cos\theta}$

$\sin\theta+\cos\theta+\dfrac{1-\cos^2\theta}{\cos\theta}$

$\sin\theta+\cos\theta+\dfrac{1}{\cos\theta}-\dfrac{\cos^2\theta}{\cos\theta}$

$\sin\theta+\cos\theta+\sec\theta-\cos\theta$

$\dfrac{\cos\theta}{\cos\theta}\sin\theta+\sec\theta$

$\cos\theta\tan\theta+\sec\theta$

5. $\dfrac{\sec^3\theta-\cos^3\theta}{\sec\theta-\cos\theta}=\sec^2\theta+1+\cos^2\theta$

$(\sec\theta-\cos\theta)(\sec^2\theta+\sec\theta\cos\theta+\cos^2\theta)$

$\sec\theta-\cos\theta$

$\sec^2\theta+1+\cos^2\theta$

6. $\csc^6 x-\cot^6 x=1+3\csc^2 x\cot^2 x$

$(\csc^2x)^3-(\cot^2x)^3$

$(\csc^2x-\cot^2x)(\csc^4x+\csc^2x\cot^2x+\cot^4x)$

$(1)(\csc^2x\csc^2x+\csc^2x\cot^2x+\cot^2x\cot^2x)$

$\csc^2x(1+\cot^2x)+\csc^2x\cot^2x+\cot^2x(\csc^2x-1)$

$\csc^2x+\cot^2x\csc^2x+\csc^2x\cot^2x+\cot^2x\csc^2x-\cot^2x$

$\csc^2x-\cot^2x+3\csc^2x\cot^2x$

$1+3\csc^2x\cot^2x$

7. $\sec^2\theta+\csc^2\theta=\sec^2\theta\csc^2\theta$

$\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}$

$\frac{\sin^2\theta+\cos^2\theta}{\cos^2\theta\sin^2\theta}$

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

$\frac{1}{\cos^2\theta}\cdot\frac{1}{\sin^2\theta}$

$\sec^2\theta\csc^2\theta$

8. $\dfrac{1+\sin x+\cos x}{1-\sin x+\cos x}=\dfrac{1+\sin x}{\cos x}$

$\frac{1+\sin x}{\cos x}\left(\frac{1-\sin x+\cos x}{1-\sin x+\cos x}\right)$

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

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

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

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

$\frac{1+\sin x+\cos x}{1-\sin x+\cos x}$

9. $\dfrac{1+\sin x+\cos x}{1+\sin x-\cos x}=\dfrac{1+\cos x}{\sin x}$

$\frac{1+\sin x+\cos x}{1+\sin x-\cos x}\left(\frac{1+\sin x+\cos x}{1+\sin x+\cos x}\right)$

$\frac{1+\sin x+\cos x+\sin x+\sin^2 x+\sin x\cos x+\cos x+\sin x\cos x+\cos^2 x}{1+\sin x+\cos x+\sin x+\sin^2 x+\sin x\cos x-\cos x-\sin x\cos x-\cos^2 x}$

$\frac{2+2\sin x\cos x+2\sin x+2\cos x}{1+2\sin x+\sin^2 x-\cos^2 x}$

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

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

10. $(2\sin x+3\cos x)^2+(3\sin x-2\cos x)^2=13$

$4\sin^2 x+12\sin x\cos x+9\cos^2 x+9\sin^2 x-12\sin x\cos x+4\cos^2 x$

$4\sin^2 x+4\cos^2 x+9\sin^2 x+9\cos^2 x$

$13(\sin^2 x+\cos^2 x)$

13

Solve each equation for $[0,2\pi)$

11. $(\tan x+1)^2=\sec^2 x$

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

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

$2\tan x=0$

$\tan x=0$

$x=0,\pi$

Solve for ALL solutions

12. $\sin^2 x+\cos^2 x-\cos x=0$

$1-\cos x=0$

$1=\cos x$

$x=0$

13. $\sin x\tan x=\dfrac{\sqrt{2}}{2}\tan x$

$\sin x\tan x-\frac{\sqrt{2}}{2}\tan x=0$

$\tan x\left(\sin x-\frac{\sqrt{2}}{2}\right)=0$

$\tan x=0$ $\quad \sin x-\frac{\sqrt{2}}{2}=0$

$\sin x=\frac{\sqrt{2}}{2}$

$0+\pi n$ $\quad \frac{\pi}{4}+2\pi n$ $\quad \frac{3\pi}{4}+2\pi n$

14. $\cos^2 x=2-\cos x$

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

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

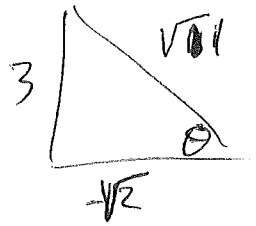
$\cos x+2=0$ $\quad \cos x-1=0$

$\cos x=-2$ $\quad \cos x=1$

$x=0+2\pi n$

Use the given values and trigonometric identities to solve for all six trigonometric functions of the angle

15. $\csc\theta = \frac{\sqrt{11}}{3}, \cos\theta < 0$



$\sin\theta = \frac{3}{\sqrt{11}}$

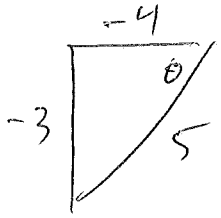
$\cos\theta = \frac{-\sqrt{2}}{\sqrt{11}}$

$\sec\theta = \frac{\sqrt{11}}{-\sqrt{2}}$

$\tan\theta = \frac{3}{-\sqrt{2}}$

$\cot\theta = \frac{-\sqrt{2}}{3}$

16. $\sec\theta = -\frac{5}{4}, \tan\theta > 0$



$\cos\theta = \frac{-4}{5}$

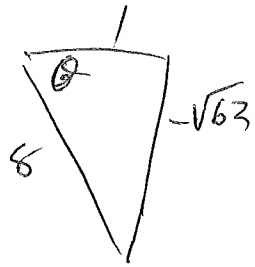
$\sin\theta = \frac{-3}{5}$

$\csc\theta = \frac{5}{-3}$

$\tan\theta = \frac{3}{4}$

$\cot\theta = \frac{4}{3}$

17. $\cos\theta = \frac{1}{8}, \tan < 0$



$\sec\theta = 8$

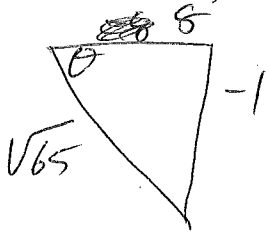
$\sin\theta = \frac{-\sqrt{63}}{8}$

$\csc\theta = \frac{-8}{\sqrt{63}}$

$\tan\theta = -\sqrt{63}$

$\cot\theta = -\frac{1}{\sqrt{63}}$

18. $\cot\theta = -8, \cos\theta > 0$



$\tan\theta = \frac{-1}{8}$

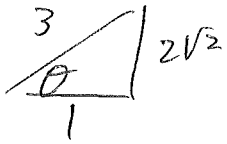
$\cos\theta = \frac{8}{\sqrt{65}}$

$\sec\theta = \frac{\sqrt{65}}{8}$

$\sin\theta = \frac{-1}{\sqrt{65}}$

$\csc\theta = -\sqrt{65}$

19. $\csc\left(\frac{\pi}{2} - \theta\right) = 3, \tan\theta > 0$



$\sec\theta = 3$

$\cos\theta = \frac{1}{3}$

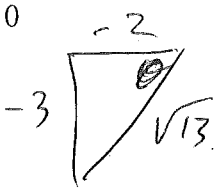
$\sin\theta = \frac{2\sqrt{2}}{3}$

$\csc\theta = \frac{3}{2\sqrt{2}}$

$\tan\theta = \frac{\sqrt{2}}{2}$

$\cot\theta = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}}$

20. $\tan\theta = \frac{3}{2}, \sec > 0$



$\cot\theta = \frac{2}{3}$

$\sin\theta = \frac{-3}{\sqrt{13}}$

$\csc\theta = \frac{\sqrt{13}}{-3}$

$\cos\theta = \frac{-2}{\sqrt{13}}$

$\sec\theta = \frac{-\sqrt{13}}{2}$