

## 6.1-6.2 Review

1. QII ( $\bar{-}, +$ )

cos  $\rightarrow$  sin  
sin  $\rightarrow$  csc

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

$$\sin^2 + (-2/5)^2 = 1$$

$$\sin^2 + 4/25 = 25/25$$

$$\sin^2 = 21/25$$

$$\sin = \sqrt{21}/5$$

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

$$\csc = \frac{1}{\sqrt{21}/5}$$

$$\csc = \frac{5}{\sqrt{21}} \cdot \frac{\sqrt{21}}{\sqrt{21}}$$

$$\csc = \frac{+5\sqrt{21}}{21}$$

2. QI (+, +)

tan  $\rightarrow$  sec

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

$$(3)^2 + 1 = \sec^2$$

$$9 + 1 = \sec^2$$

$$10 = \sec^2$$

$$\sqrt{10} = \sec$$

3. QII ( $-$ , +)

sin  $\rightarrow$  cos

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

$$(2/3)^2 + \cos^2 = 1$$

$$4/9 + \cos^2 = 9/9$$

$$\cos^2 = 5/9$$

$$\cos = -\frac{\sqrt{5}}{3}$$

4. QIV (+, -)

$$\cot \rightarrow \csc$$

$$\csc \rightarrow \sin$$

$$\sin \rightarrow \cos$$

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

$$1 + (-2)^2 = \csc^2$$

$$1 + 4 = \csc^2$$

$$5 = \csc^2$$

$$\csc = \sqrt{5}$$

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

$$\sin = \frac{1}{\sqrt{5}}$$

$$\sin = \frac{\sqrt{5}}{5}$$

5.  $(\sin^2 + \cos^2) + \tan^2$

$$= 1 + \tan^2$$

$$= \sec^2$$

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

$$\left(\frac{\sqrt{5}}{5}\right)^2 + \cos^2 = 1$$

$$\frac{5}{25} + \cos^2 = \frac{25}{25}$$

$$\cos^2 = \frac{20}{25}$$

$$\sqrt{\cos^2} = \sqrt{4/5}$$

$$\cos = \frac{2}{\sqrt{5}}$$

$$\boxed{\cos = \frac{2\sqrt{5}}{5}}$$

6.  $\sin \theta \csc \theta + \tan \theta \cot \theta$

$$= \sin \theta \cdot \frac{1}{\sin \theta} + \tan \theta \cdot \frac{1}{\tan \theta}$$

$$= 1 + 1$$

$$= 2$$

7.  $\tan^2 \theta \cdot \cos^2 \theta$

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

$$= \sin^2 \theta$$

9.  $\csc \theta - \cos \theta \cot \theta$

$$= \frac{1}{\sin \theta} - \cos \theta \cdot \frac{\cos \theta}{\sin \theta}$$

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

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

$$= \frac{\sin^2 \theta}{\sin \theta}$$

$$= \sin \theta$$

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

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

$$= \csc^2 \theta$$

$$= \csc^2 \theta$$

$$\begin{aligned}
 10. \quad & \cot \theta \tan \theta - \sec \theta \cos \theta \\
 &= \frac{\cos \theta}{\sin \theta} \cdot \frac{\sin \theta}{\cos \theta} - \frac{1}{\cos \theta} \cdot \frac{\cos \theta}{1} \\
 &= 1 - 1 = 0
 \end{aligned}$$

$$\begin{aligned}
 11. \quad & (1 + \cos \theta)(\csc \theta - \cot \theta) \\
 &= \csc \theta - \cot \theta + \cos \theta \csc \theta - \cos \theta \cot \theta \\
 &= \csc \theta - \cot \theta + \cos \theta \cdot \frac{1}{\sin \theta} - \cos \theta \cdot \frac{\cos \theta}{\sin \theta} \\
 &= \frac{1}{\sin \theta} - \frac{\cos \theta}{\sin \theta} + \frac{\cos \theta}{\sin \theta} - \frac{\cos^2 \theta}{\sin \theta} \\
 &= \frac{1 - \cos^2 \theta}{\sin \theta} = \frac{\sin^2 \theta}{\sin \theta} = \sin \theta
 \end{aligned}$$

$$\begin{aligned}
 12. \quad & (1 - \sin \theta)(\sec \theta + \tan \theta) \\
 &= \sec \theta + \tan \theta - \sin \theta \cdot \sec \theta + \sin \theta \tan \theta \\
 &= \frac{1}{\cos \theta} + \frac{\sin \theta}{\cos \theta} - \frac{\sin \theta}{\cos \theta} - \sin \theta \cdot \frac{\sin \theta}{\cos \theta} \\
 &= \frac{1}{\cos \theta} - \frac{\sin^2 \theta}{\cos \theta} = \frac{\cos^2 \theta}{\cos \theta} = \cos \theta
 \end{aligned}$$

$$\begin{aligned}
 13. \quad & \sin \theta \cot \theta \sec \theta = 1 \\
 & \sin \theta \cdot \frac{\cos \theta}{\sin \theta} \cdot \frac{1}{\cos \theta} = 1 \\
 & 1 = 1
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & \frac{\sin \theta}{1 - \cos^2 \theta} = \csc \theta \\
 & \frac{\sin \theta}{\sin^2 \theta} = \csc \theta \\
 & \frac{1}{\sin \theta} = \csc \theta \\
 & \csc \theta = \csc \theta
 \end{aligned}$$

$$15. \frac{1}{\sin^2 \theta} - \frac{1}{\tan^2 \theta} = 1$$

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

$$1 = 1$$

$$16. \cos^2 \theta \tan^2 \theta + \sin^2 \theta \cot^2 \theta = 1$$

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

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

$$1 = 1$$

$$17. \sin \theta (1 + \cot^2 \theta) = \csc \theta$$

$$\sin \theta \cdot \csc^2 \theta = \csc \theta$$

$$\sin \theta \cdot \frac{1}{\sin^2 \theta} = \csc \theta$$

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

$$\csc \theta = \csc \theta$$

$$18. \frac{\cot \theta}{1 + \cot^2 \theta} = \cos \theta \sin \theta$$

$$\frac{\cot \theta}{\csc^2 \theta} = \cos \theta \sin \theta$$

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

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

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

$$19. \tan \theta \sin \theta + \cos \theta = \sec \theta$$

$$\frac{\sin \theta}{\cos \theta} \cdot \sin \theta + \cos \theta = \sec \theta$$

$$\frac{\sin^2 \theta}{\cos \theta} + \cos \theta \stackrel{\cos}{\cancel{\cos}} = \sec \theta$$

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

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

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

$$\sec \theta = \sec \theta$$

$$20. \frac{\tan^2 \theta}{\sec \theta + 1} = \frac{1 - \cos \theta}{\cos \theta}$$

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

$$\frac{(\sec \theta - 1)(\sec \theta + 1)}{\sec \theta + 1} = \frac{1 - \cos \theta}{\cos \theta}$$

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

$$\sec \theta - 1 = \sec \theta - 1$$