

Trig Identity Sheet

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

1.  $(1 + \sin x)(1 - \sin x)$

$$1 - \sin^2 x \leftarrow \text{identity}$$
$$\cos^2 x$$

2.  $\tan \theta \cot \theta + \cos \theta \sec \theta$

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

$$1 + 1$$

$$= 2$$

3.  $(\csc \theta - 1)(\csc \theta + 1)$

$$\csc^2 \theta - 1 \leftarrow \text{Identity}$$

$$\cot^2 \theta$$

4.  $\frac{\sin B}{\csc B} + \frac{\cos B}{\sec B}$

$$\frac{\sin B}{\frac{1}{\sin B}} + \frac{\cos B}{\frac{1}{\cos B}}$$

$$\sin^2 B + \cos^2 B \leftarrow \text{identity}$$

$$= 1$$

$$5. \frac{1 + \tan^2 \theta}{1 + \cot^2 \theta} \leftarrow \text{identity}$$

$$\leftarrow \text{identity}$$

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

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

$$= \tan^2 \theta$$

$$6. \frac{\tan x + \cot x}{\sec^2 x}$$

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

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

→ identity  $\sin^2 x + \cos^2 x = 1$

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

$$\Rightarrow \frac{\cos x}{\sin x} = \cot x$$

$$7. (\csc A - \cot A)(1 + \cos A)$$

$$\csc A + \cos A \csc A - \cot A - \cot A \cos A$$

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

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

$$\begin{aligned} 8. \quad & \sin^3 \theta + \sin \theta \cos^2 \theta \\ & \sin \theta (\sin^2 \theta + \cos^2 \theta) \\ & \sin \theta (1) \\ & \sin \theta \end{aligned}$$

## 6.2: Sum, Difference and Double-Angle Identities

### Sum Identities

$$\begin{aligned}\sin(A+B) &= \sin A \cos B + \cos A \sin B \\ \cos(A+B) &= \cos A \cos B - \sin A \sin B \\ \tan(A+B) &= \frac{\tan A + \tan B}{1 - \tan A \tan B}\end{aligned}$$

### Difference Identities

$$\begin{aligned}\sin(A-B) &= \sin A \cos B - \cos A \sin B \\ \cos(A-B) &= \cos A \cos B + \sin A \sin B \\ \tan(A-B) &= \frac{\tan A - \tan B}{1 + \tan A \tan B}\end{aligned}$$

examples pg. 301

1 a)  $\sin 48^\circ \cos 17^\circ - \cos 48^\circ \sin 17^\circ$   
 $\times \sin(A-B)$   
 $\sin(48^\circ - 17^\circ)$   
 $\sin 31^\circ$

b)  $\cos 75^\circ$  Determine the EXACT value  
 $45^\circ + 30^\circ$  ↓  
special angles

$\cos(45^\circ + 30^\circ)$  \* Identity

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

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

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

pg. 307

1 a, b, d

8. b, c, d

2 a, b, d