4-4 Notes Sum & Difference Formulas Name _____
Pre-Calculus

Formulas

$$\cos(\alpha+\beta)=\cos\alpha\cos\beta-\sin\alpha\sin\beta \qquad \sin(\alpha+\beta)=\sin\alpha\cos\beta+\cos\alpha\sin\beta \qquad \tan(\alpha+\beta)=\frac{\tan\alpha+\tan\beta}{1-\tan\alpha\tan\beta}$$

$$\cos(\alpha-\beta)=\cos\alpha\cos\beta+\sin\alpha\sin\beta \qquad \sin(\alpha-\beta)=\sin\alpha\cos\beta-\cos\alpha\sin\beta \qquad \tan(\alpha-\beta)=\frac{\tan\alpha-\tan\beta}{1+\tan\alpha\tan\beta}$$

The sum and difference identities may be used to find the exact value of angles not found on the unit circle.

1. cos 75°

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

3. sin $\frac{7\pi}{12}$

4. sin 80° cos 20° − cos 80° sin 20°

5. Given: $\sin\alpha=\frac{4}{5}$, $\pi<\alpha<\frac{\pi}{2}$ and $\sin\beta=-\frac{2\sqrt{5}}{5}$, $\pi<\beta<\frac{3\pi}{2}$

a) find cosα

b) find cos β

c) find cos $(\alpha+\beta)$

d) find sin $(\alpha+\beta)$

Establish the Identities

6. $\dfrac{\cos(\alpha-\beta)}{\sin\alpha\sin\beta}=\cot\alpha\cot\beta+1$

7. $\tan(\theta+\pi)=\tan\theta$

8. $\tan\left(\theta+\dfrac{\pi}{2}\right)=-\cot\theta$

9. Find the exact value of $\sin\left(cos^{-1}\dfrac{1}{2}+sin^{-1}\dfrac{3}{5}\right)$