

Pre Calculus
Chapter 7 Study Guide

I will provide the sum/difference, double-angle, and half-angle identities (see next page)

1) Find the exact value of $\tan 375^\circ$ using the sum or difference formula.

For #2 - 3. If $\cot x = \frac{4}{3}$, $\csc y = \frac{5}{4}$, $0 < x < \frac{\pi}{2}$ and $0 < y < \frac{\pi}{2}$, find the following:

2) $\tan(x - y)$

3) $\sin(x + y)$

For #4 - 5. If $\cot \theta = -\frac{\sqrt{6}}{3}$, $90^\circ < \theta < 180^\circ$; Find:

4) $\csc \theta$

5) $\cos \theta$

For #6 - 7. Use a half angle identity to find the exact value of:

6) $\tan 112.5^\circ$

7) $\sin 525^\circ$

For #8 - 10. If $\csc \theta = -\frac{3}{2}$ and $\pi < \theta < \frac{3\pi}{2}$, find:

8) $\sin 2\theta$

9) $\cos 2\theta$

10) $\tan 2\theta$

11) Solve $\sin 2x = -\sin x$ for $0 \leq x < 360$.

12) Solve $2 \tan^2 x - \sec^2 x + 3 = 1 - 2 \tan x$ for $0 < x < 180$.

13) Prove the identity below.

$$\frac{1 - \cos^2 x}{1 - \sin^2 x} + \csc^2 x - \cot^2 x = \sec^2 x$$

14) Prove the identity below:

$$\frac{\sec \theta - \csc \theta}{\csc \theta \sec \theta} = \sin \theta - \cos \theta$$

Chapter 7 FORMULAS

Sum and Difference Identities

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Half-Angle Identities

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

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

$$\tan\left(\frac{u}{2}\right) = \sqrt{\frac{1 - \cos(u)}{1 + \cos(u)}}$$

Double-Angle Identities

$$\sin(2t) = 2 \sin(t) \cos(t)$$

$$\cos(2t) = \cos^2(t) - \sin^2(t)$$

$$= 2 \cos^2(t) - 1$$

$$= 1 - 2 \sin^2(t)$$

$$\tan(2t) = \frac{2 \tan(t)}{1 - \tan^2(t)}$$