

Name _____
Mr. Schlansky

Date _____
Pre Calculus

Trigonometric Ratios with Identities

Functions of the Sum of Two Angles

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

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

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

Functions of the Difference of Two Angles

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

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

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

Functions of the Double Angle

$$\sin 2A = 2 \sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$\cos 2A = 2 \cos^2 A - 1$$

$$\cos 2A = 1 - 2 \sin^2 A$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

Functions of the Half Angle

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

$$\cos \frac{1}{2} A = \pm \sqrt{\frac{1 + \cos A}{2}}$$

$$\tan \frac{1}{2} A = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}}$$

1. If $\sin A = \frac{5}{13}$, and A is an angle in quadrant I, find the value of $\cos 2A$.

2. If $\cos \theta = \frac{\sqrt{7}}{4}$, and $0 < \theta < \frac{\pi}{2}$, find the value of $\cos 2\theta$.

3. If $\sin x = \frac{4}{5}$, and $\frac{\pi}{2} < x < \pi$, find the value of $\sin 2x$.

4. If $\sin B < 0$ and $\tan B = -\frac{3}{4}$, find the value of $\tan 2B$.

5. If $\sin \theta = \frac{3}{5}$, and $\cos \theta < 0$, find $\sin \frac{1}{2}\theta$.

6. If $\tan \theta = -\frac{4}{7}$, and $\sin \theta > 0$, find $\cos \frac{1}{2}\theta$.

7. If $\sin \theta = -\frac{2}{3}$, and $\pi < \theta < \frac{3\pi}{2}$, find $\tan \frac{1}{2}\theta$.

8. If $\csc \theta = \frac{9}{8}$, and $\cos \theta < 0$, find $\cos \frac{1}{2}\theta$.

9. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{5}{13}$, and angles A and B are positive acute angles, find $\cos(A - B)$

10. If angle A terminates in quadrant I with $\cos A = \frac{8}{17}$ and angle B terminates in quadrant III with $\tan B = \frac{4}{3}$, find the value of $\sin(A + B)$.

11. If $\tan x = -\frac{5}{4}$ and $\cos y = \frac{5}{\sqrt{29}}$, and x terminates in quadrant II and y terminates in quadrant IV, find the value of $\tan(x - y)$.

12. If $\frac{\pi}{2} < A < \pi$ with $\sin A = \frac{7}{25}$ and $\frac{3\pi}{2} < B < 2\pi$ with $\sin B = -\frac{5}{13}$, find the value of $\sin(A - B)$.