

Honors Algebra II/Trig
14.3 Worksheet

Name: key

1. Find the exact value of $\sin 15^\circ$

$$\sin(45^\circ - 30^\circ) =$$

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

$$\frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$$

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

3. Find the exact value of $\cos 75^\circ$

$$\cos(30^\circ + 45^\circ) =$$

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

$$\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

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

2. Find the exact value of $\cos 105^\circ$.

$$\cos(60^\circ + 45^\circ)$$

$$\cos 60 \cos 45 - \sin 60 \sin 45$$

$$\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}$$

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

4. Find the exact value of $\sin 105^\circ$.

$$\sin(60^\circ + 45^\circ)$$

$$\sin 60 \cos 45 + \cos 60 \sin 45$$

$$\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

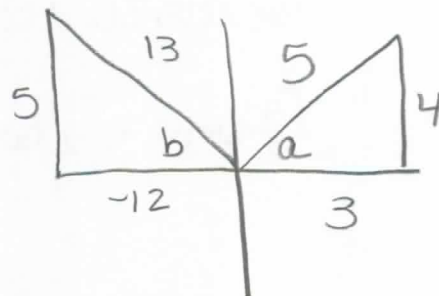
$$\boxed{\frac{\sqrt{6} + \sqrt{2}}{4}}$$

5. Find the exact value of $\sin(a-b)$ given that $\sin a = \frac{4}{5}$, $0 < a < \frac{\pi}{2}$ and $\cos b = -\frac{12}{13}$, $\frac{\pi}{2} < b < \pi$.

$$\sin a \cos b - \cos a \sin b$$

$$\frac{4}{5} \cdot \frac{-12}{13} - \frac{3}{5} \cdot \frac{5}{13}$$

$$\frac{-48 - 15}{65} = \boxed{\frac{-63}{65}}$$

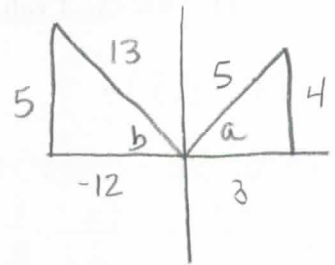


6. Find the exact value of $\cos(a+b)$ given that $\sin a = \frac{4}{5}$, $0 < a < \frac{\pi}{2}$ and $\cos b = -\frac{12}{13}$, $\frac{\pi}{2} < b < \pi$.

$$\cos a \cos b - \sin a \sin b$$

$$\frac{3}{5} \cdot \frac{-12}{13} - \frac{4}{5} \cdot \frac{5}{13}$$

$$\frac{-36 - 20}{65} = \boxed{\frac{-56}{65}}$$

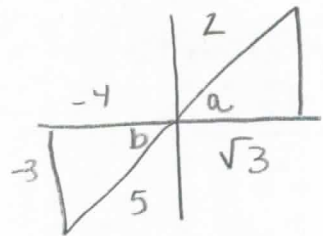


7. Find the exact value of $\cos(a-b)$ given that $\sin a = \frac{1}{2}$, $\cos a > 0$ and $\tan b = \frac{3}{4}$, $\sin b < 0$.

$$\cos a \cos b + \sin a \sin b$$

$$\frac{\sqrt{3}}{2} \cdot \frac{-4}{5} + \frac{1}{2} \cdot \frac{-3}{5}$$

$$\boxed{\frac{-4\sqrt{3} - 3}{10}}$$



8. Prove: $\sin(x+30^\circ) + \cos(x+60^\circ) = \cos x$

$$\sin x \cos 30^\circ + \cos x \sin 30^\circ + \cos x \cos 60^\circ - \sin x \sin 60^\circ = \cos x$$

$$\frac{\sqrt{3}}{2} \sin x + \frac{1}{2} \cos x + \frac{1}{2} \cos x - \frac{\sqrt{3}}{2} \sin x = \cos x$$

$$\cos x = \cos x$$