

Notes/Guided Practice: 5.4 Sum and Difference Formulas**Sum and Difference Formulas**

$$\sin(u \pm v) = \sin u \cos v \pm \cos u \sin v$$

$$\cos(u \pm v) = \cos u \cos v \mp \sin u \sin v$$

$$\tan(u \pm v) = \frac{\tan u \pm \tan v}{1 \mp \tan u \tan v}$$

These formulas are used to find *exact* trigonometric values using the basic trigonometric values (of special angles) we already know.

Example #1**Find the exact values of sine, cosine, and tangent of 105° .****Example #2****Find the exact values of sine, cosine, and tangent of $\frac{\pi}{12}$.****Example #3****Write $\sin 3.5 \cos 1.2 - \cos 3.5 \sin 1.2$ as the sine, cosine or tangent of an angle.**

Example #4

Find the exact value of $\cos(u + v)$ given that $\sin u = \frac{5}{13}$,

$$0 < u < \frac{\pi}{2}, \cos v = -\frac{3}{5}, \text{ and } \frac{\pi}{2} < v < \pi$$

Example #5

Find the exact value of $\sin(u + v)$ given that $\sin u = \frac{4}{5}$,

$$0 < u < \frac{\pi}{2}, \cos v = -\frac{12}{13}, \text{ and } \pi < v < \frac{3\pi}{2}$$

Example #6

Write the trigonometric expression as an algebraic expression:
 $\cos(\arctan 1 + \arccos x)$

Example #7 Write the trigonometric expression as an algebraic expression:
 $\cos(\arcsin x - \arctan 2x)$

Example #8 Verify: $\sin\left(\frac{\pi}{2} + x\right) = \cos x$

Example #9 Verify: $\cos(x + \pi)\cos(x - \pi) = \cos^2 x$

Example #10 Simplify: $\cos\left(x - \frac{3\pi}{2}\right)$

Example #11

Simplify: $\tan(x + 3\pi)$

Example #12

Find all solutions on the interval $[0, 2\pi]$.

$$\sin\left(x + \frac{\pi}{3}\right) + \sin\left(x - \frac{\pi}{3}\right) = 1$$

Example #13

Find all solutions on the interval $[0, 2\pi]$.

$$\tan(x + \pi) + 2\sin(x + \pi) = 0$$
