SUM AND DIFFERENCE IDENTITIES FOR COSINE

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

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

1

No Decimals

1. Use the sum or difference identities to find the exact value. 15° is not on the unit circle

Come up with 2 angles on the unit circle that subtract to give us 15°.

* Do Not distribute a trig function.

45° - 30°
65° - 45°

$\cos 15°$

$= \cos(45° - 30°) \neq \cos 45° - \cos 30°$

Use difference identity for cosine

$\cos 15° = \cos 45° \cos 30° + \sin 45° \sin 30°$

$= \left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$

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

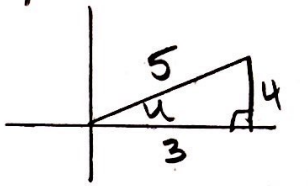
2

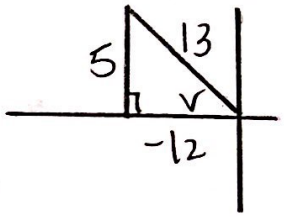
No Decimals

2. Find the exact value of each trigonometric function, given: Do not know angle measure.

$\sin u = \frac{\text{opp}}{\text{hyp}} = \frac{4}{5}$, where $0 < u < \frac{\pi}{2}$ and Q_1

$\cos v = \frac{\text{adj}}{\text{hyp}} = \frac{12}{13}$, where $\frac{\pi}{2} < v < \pi.$ Q_2





a. $\cos(u+v) = \cos u \cdot \cos v - \sin u \cdot \sin v$

$= \left(\frac{3}{5}\right)\left(\frac{-12}{13}\right) - \left(\frac{4}{5}\right)\left(\frac{5}{13}\right)$

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

b. $\cos(v-u)$

$= \cos v \cos u + \sin v \sin u$

$= \left(-\frac{12}{13}\right)\left(\frac{3}{5}\right) + \left(\frac{5}{13}\right)\left(\frac{4}{5}\right)$

$= -\frac{36}{65} + \frac{20}{65} = \boxed{\frac{-16}{65}}$