

Find the exact value of each expression.

1.  $\cos\left(\frac{\pi}{6} + \frac{\pi}{3}\right)$

$$\cos\frac{\pi}{6}\cos\frac{\pi}{3} - \sin\frac{\pi}{6}\sin\frac{\pi}{3}$$

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

$$\frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4} = \boxed{0}$$

2.  $\cos\frac{\pi}{6} + \cos\frac{\pi}{3}$

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

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

Use the sum and difference formulas to find the exact values of the cosine of the angle.

4.  $75^\circ = 30^\circ + 45^\circ$

$$\cos(30+45)$$

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

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

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

6.  $195^\circ = 225^\circ - 30^\circ$

$$\cos(225-30)$$

$$\cos 225 \cos 30 + \sin 225 \sin 30$$

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

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

5.  $105^\circ = 60^\circ + 45^\circ$

$$\cos(60+45)$$

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

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

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

7.  $\frac{11\pi}{12} = \frac{3\pi}{4} + \frac{\pi}{6}$

$$\cos\left(\frac{3\pi}{4} + \frac{\pi}{6}\right)$$

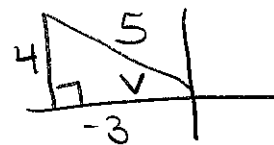
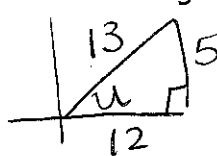
$$\cos\frac{3\pi}{4}\cos\frac{\pi}{6} - \sin\frac{3\pi}{4}\sin\frac{\pi}{6}$$

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

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

Find the exact value of the trigonometric function given the following:

$$\sin u = \frac{5}{13}, \quad 0 < u < \frac{\pi}{2} \quad \text{and} \quad \cos v = -\frac{3}{5}, \quad \frac{\pi}{2} < v < \pi$$



8.  $\cos(v - u)$

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

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

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

9.  $\cos(u + v)$

$$\cos u \cos v - \sin u \sin v$$

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

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