

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

Find the exact value of each expression.

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

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

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

$$= \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} = \boxed{0}$$

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

$$\cos 75^\circ = \cos(30^\circ + 45^\circ)$$

$$= \cos 30^\circ \cdot \cos 45^\circ - \sin 30^\circ \cdot \sin 45^\circ$$

$$= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \frac{1}{2} \cdot \frac{\sqrt{2}}{2} = \boxed{\frac{\sqrt{6}-\sqrt{2}}{4}}$$

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

$$\cos 105^\circ = \cos(60^\circ + 45^\circ)$$

$$= \cos 60^\circ \cdot \cos 45^\circ - \sin 60^\circ \cdot \sin 45^\circ$$

$$= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} = \boxed{\frac{\sqrt{2}-\sqrt{6}}{4}}$$

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

$$\cos 195^\circ = \cos(225^\circ - 30^\circ)$$

$$= \cos 225^\circ \cdot \cos 30^\circ + \sin 225^\circ \cdot \sin 30^\circ$$

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

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

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

$$= \cos\frac{11\pi}{12} = \cos\left(\frac{3\pi}{4} + \frac{\pi}{6}\right)$$

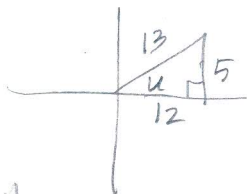
$$= \cos\frac{3\pi}{4} \cdot \cos\frac{\pi}{6} - \sin\frac{3\pi}{4} \cdot \sin\frac{\pi}{6}$$

$$= \left(-\frac{\sqrt{2}}{2}\right) \cdot \left(\frac{\sqrt{3}}{2}\right) - \left(\frac{\sqrt{2}}{2}\right) \cdot \left(\frac{1}{2}\right) = \boxed{\frac{-\sqrt{6}-\sqrt{2}}{4}}$$

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. $\cos(v - u)$

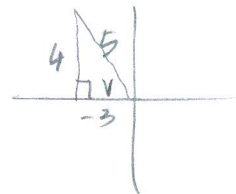


$$= \cos v \cdot \cos u + \sin v \cdot \sin u$$

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

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

9. $\cos(u + v)$



$$= \cos u \cdot \cos v - \sin u \cdot \sin v$$

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

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