

Find the exact value of each expression.

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

2. $\cos\left(\frac{3\pi}{4} + \frac{5\pi}{6}\right)$

Write the expression as sine, cosine, or tangent.

3. $\cos 25^\circ \cos 15^\circ - \sin 25^\circ \sin 15^\circ$

4. $\sin 140^\circ \cos 50^\circ + \cos 140^\circ \sin 50^\circ$

Find the exact value of the trig function given that

$$\sin u = -\frac{7}{25} \quad \frac{3\pi}{2} < u < 2\pi$$

$$\cos v = -\frac{4}{5} \quad \frac{\pi}{2} < v < \pi$$

5. $\cos(u + v)$

6. $\sec(u + v)$

7. $\cot(v - u)$

Verify the identities.

8. $\sin(3\pi - x) = \sin x$

9. $\sin\left(\frac{\pi}{2} + x\right) = \cos x$

11. $\sin(x + y) + \sin(x - y) = 2\sin x \cos y$

$$12. \cos x + \frac{\sin^2 x}{\cos x} = \sec x$$

$$14. \cos x + \tan x \sin x = \sec x$$

$$15. \sin^3 x(1 - 2\cos^2 x + \cos^4 x) = \sin^7 x$$

$$16. \frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$$