

Find each exact value if $0 < x < \frac{\pi}{2}$ and $0 < y < \frac{\pi}{2}$.

26. $\sin(x + y)$ if $\cos x = \frac{8}{17}$ and $\sin y = \frac{12}{37}$

27. $\cos(x - y)$ if $\cos x = \frac{3}{5}$ and $\cos y = \frac{4}{5}$

28. $\tan(x - y)$ if $\sin x = \frac{8}{17}$ and $\cos y = \frac{3}{5}$

29. $\cos(x + y)$ if $\tan x = \frac{5}{3}$ and $\sin y = \frac{1}{3}$

30. $\tan(x + y)$ if $\cot x = \frac{6}{5}$ and $\sec y = \frac{3}{2}$

31. $\sec(x - y)$ if $\csc x = \frac{5}{3}$ and $\tan y = \frac{12}{5}$

32. If α and β are two angles in Quadrant I such that $\sin \alpha = \frac{1}{5}$ and $\cos \beta = \frac{2}{7}$, find $\sin(\alpha - \beta)$.

33. If x and y are acute angles such that $\cos x = \frac{1}{3}$ and $\cos y = \frac{3}{4}$, what is the value of $\cos(x + y)$?

Verify that each equation is an identity.

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

35. $\cos(60^\circ + A) = \sin(30^\circ - A)$

36. $\sin(A + \pi) = -\sin A$

37. $\cos(180^\circ + x) = -\cos x$

38. $\tan(x + 45^\circ) = \frac{1 + \tan x}{1 - \tan x}$

39. $\sin(A + B) = \frac{\tan A + \tan B}{\sec A \sec B}$

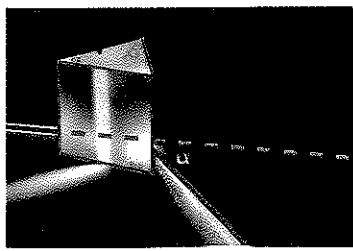
40. $\cos(A + B) = \frac{1 - \tan A \tan B}{\sec A \sec B}$

41. $\sec(A - B) = \frac{\sec A \sec B}{1 + \tan A \tan B}$

42. $\sin(x + y) \sin(x - y) = \sin^2 x - \sin^2 y$

43. Electronics In an electric circuit containing a capacitor, inductor, and resistor the voltage drop across the inductor is given by $V_L = I_0 \omega L \cos\left(\omega t + \frac{\pi}{2}\right)$, where I_0 is the peak current, ω is the frequency, L is the inductance, and t is time. Use the sum identity for cosine to express V_L as a function of $\sin \omega t$.

44. Optics The index of refraction for a medium through which light is passing is the ratio of the velocity of light in free space to the velocity of light in the medium. For light passing symmetrically through a glass prism, the index of refraction n is given by the



$$\text{equation } n = \frac{\sin\left[\frac{1}{2}(\alpha + \beta)\right]}{\sin\frac{\beta}{2}}, \text{ where } \alpha \text{ is the}$$

deviation angle and β is the angle of the apex of the prism as shown in the