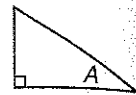


3. Write an interpretation of the identity $\sin(90^\circ - A) = \cos A$ in terms of a right triangle.



4. Derive a formula for $\cot(\alpha + \beta)$ in terms of $\cot \alpha$ and $\cot \beta$.

Practice

Use sum or difference identities to find the exact value of each trigonometric function.

5. $\cos 165^\circ$

6. $\tan \frac{\pi}{12}$

7. $\sec 795^\circ$

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

8. $\sin(x - y)$ if $\sin x = \frac{4}{9}$ and $\sin y = \frac{1}{4}$

9. $\tan(x + y)$ if $\csc x = \frac{5}{3}$ and $\cos y = \frac{5}{13}$

Verify that each equation is an identity.

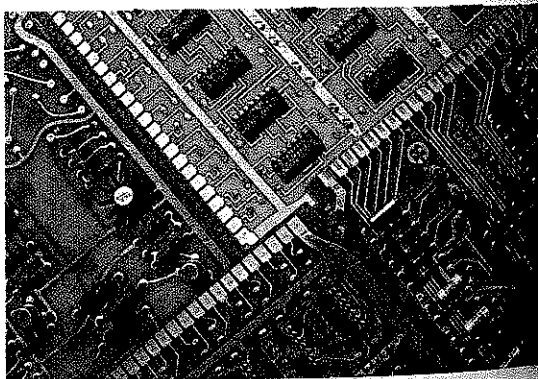
10. $\sin(90^\circ + A) = \cos A$

11. $\tan\left(\theta + \frac{\pi}{2}\right) = -\cot \theta$

12. $\sin(x - y) = \frac{1 - \cot x \tan y}{\csc x \sec y}$

13. Electrical Engineering

Analysis of the voltage in certain types of circuits involves terms of the form $\sin(n\omega_0 t - 90^\circ)$, where n is a positive integer, ω_0 is the frequency of the voltage, and t is time. Use an identity to simplify this expression.



EXERCISES

Use sum or difference identities to find the exact value of each trigonometric function.

14. $\cos 105^\circ$

15. $\sin 165^\circ$

16. $\cos \frac{7\pi}{12}$

17. $\sin \frac{\pi}{12}$

18. $\tan 195^\circ$

19. $\cos\left(-\frac{\pi}{12}\right)$

20. $\tan 165^\circ$

21. $\tan \frac{23\pi}{12}$

22. $\sin 735^\circ$

23. $\sec 1275^\circ$

24. $\csc \frac{5\pi}{12}$

25. $\cot \frac{113\pi}{12}$

Find each

26. $\sin(x)$

27. $\cos(x)$

28. $\tan(x)$

29. $\cos(x)$

30. $\tan(x)$

31. $\sec(x)$

32. If α and β are angles such that $\sin(\alpha) = \frac{1}{2}$ and $\cos(\beta) = \frac{1}{2}$, find $\sin(\alpha + \beta)$.

33. If x and y are angles such that $\sin(x) = \frac{1}{2}$ and $\cos(y) = \frac{1}{2}$, find $\sin(x - y)$.

Verify that

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

36. $\sin(A) = \cos\left(\frac{\pi}{2} - A\right)$

38. $\tan(x) = \frac{\sin(x)}{\cos(x)}$

40. $\cos(A) = \sin\left(\frac{\pi}{2} - A\right)$

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

Applications and Problem Solving



43. Electro

the voltage V_0 is the maximum value of the sinusoidal function $V = V_0 \sin(\omega t)$.

44. Optics

through a slit. The velocity v of the light passing through the slit is given by $v = v_0 \sin(\theta)$.

equation

deviation

diagram