

Chapter 5 Review

Section 1→ Simplify the Following Expressions

1. $\frac{1}{\tan^2 x + 1}$
2. $\csc^2 x (1 - \cos^2 x)$
3. $\sin x (\csc x - \sin x)$

Section 2→ Verify the Trigonometric Identity

1. $\frac{\csc(-x)}{\sec(-x)} = -\cot x$
2. $\cot^2 x - \cos^2 x = \cot^2 x \cos^2 x$

Section 3→ Solving a Trigonometric Equation

1. Determine the general solutions of $4\cos^2 x - 3 = 0$
2. Find all solutions of the equation $2\sin^2 x - 3\sin x = -1$ in the interval $[0, 2\pi)$
3. Find all solutions of the equation $\sqrt{3}\tan 3x = 0$ in the interval $[0, 2\pi)$

Section 4→ Sum and Difference Formulas

1. Find the exact value of the sine, cosine, and tangent of $\frac{31\pi}{12}$
2. Find all solutions of $\sin(x + \frac{\pi}{2}) - \sin(x - \frac{\pi}{2}) = \sqrt{2}$ in the interval $[0, 2\pi)$
3. Find the exact value of $\tan(u + v)$ given that $\sin u = \frac{4}{5}$ and $\cos v = \frac{-7}{25}$

Section 5→ Multiple-Angles and Product-to-Sum Formulas

1. Given $\tan u = \frac{-2}{9}$, $\frac{\pi}{2} < u < \pi$, find the exact values of $\sin 2u$, $\cos 2u$, and $\tan 2u$ using the double-angle formulas.
2. Use the half-angle formulas to determine the exact values of sine, cosine, and tangent of $\frac{7\pi}{8}$.
3. Find the exact values of $\sin \frac{u}{2}$, $\cos \frac{u}{2}$, $\tan \frac{u}{2}$ using the half-angle formulas given $\tan u = \frac{4}{3}$ and $\pi < u < \frac{3\pi}{2}$.
4. Find all solutions to $\tan^2 x + \tan x = 0$ on the interval $[0, 2\pi)$.