

Chapter Test

The Interactive CD-ROM and Internet versions of this text provide answers to the Chapter Tests and Cumulative Tests. They also offer Chapter Pre-Tests (which test key skills and concepts covered in previous chapters) and Chapter Post-Tests, both of which have randomly generated exercises with diagnostic capabilities.

Take this test as you would take a test in class. After you are done, check your work against the answers given in the back of the book.

- If $\tan \theta = \frac{3}{5}$ and $\cos \theta < 0$, use the fundamental identities to evaluate the other five trigonometric functions of θ .
- Use the fundamental identities to simplify $\csc^2 \beta(1 - \cos^2 \beta)$.
- Factor and simplify $\frac{\sec^4 x - \tan^4 x}{\sec^2 x + \tan^2 x}$.
- Add and simplify $\frac{\cos \theta}{\sin \theta} + \frac{\sin \theta}{\cos \theta}$.
- Determine the values of θ , $0 \leq \theta < 2\pi$, for which $\tan \theta = -\sqrt{\sec^2 \theta - 1}$ is true.
- Use a graphing utility to graph the functions $y_1 = \cos x + \sin x \tan x$ and $y_2 = \sec x$. Make a conjecture about y_1 and y_2 . Verify the result analytically.

In Exercises 7–12, verify the identity.

- $\sin \theta \sec \theta = \tan \theta$
- $\frac{\csc \alpha + \sec \alpha}{\sin \alpha + \cos \alpha} = \cot \alpha + \tan \alpha$
- $\sin(n\pi + \theta) = (-1)^n \sin \theta$, n is an integer.
- $(\sin x + \cos x)^2 = 1 + \sin 2x$
- Rewrite $\sin^4 x \tan^2 x$ in terms of the first power of the cosine.
- Use a half-angle formula to simplify the expression $\frac{\sin 4\theta}{1 + \cos 4\theta}$.
- Write $4 \cos 2\theta \sin 4\theta$ as a sum or difference.
- Write $\sin 3\theta - \sin 4\theta$ as a product.
- $\sec^2 x \tan^2 x + \sec^2 x = \sec^4 x$
- $\cos\left(x + \frac{\pi}{2}\right) = -\sin x$

In Exercises 17–20, find all solutions of the equation in the interval $[0, 2\pi)$.

- $\tan^2 x + \tan x = 0$
- $\sin 2\alpha - \cos \alpha = 0$
- $4 \cos^2 x - 3 = 0$
- $\csc^2 x - \csc x - 2 = 0$
- Use a graphing utility to approximate the solutions of the equation $3 \cos x - x = 0$ accurate to three decimal places.
- Explain why the equation $\cos^2 x + \cos x - 6 = 0$ has no solution.
- Find the exact value of $\cos 105^\circ$ using the fact that $105^\circ = 135^\circ - 30^\circ$.
- Use the figure to find the exact values of $\sin 2u$ and $\tan 2u$.
- The index of refraction n of a transparent material is the ratio of the speed of light in a vacuum to the speed of light in the material. For the glass triangular prism in the figure, $n = 1.5$ and $\alpha = 60^\circ$. Find the angle θ for the glass prism.

$$n = \frac{\sin(\theta/2 + \alpha/2)}{\sin(\theta/2)}$$

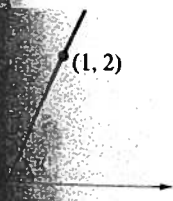


FIGURE 24

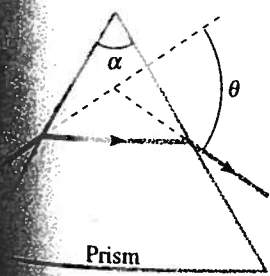


FIGURE 25