

For Problem 1-6, use:

$(-7, 24)$ is on the terminal side of C and

$$\csc Q = -\frac{17}{8} \text{ in QIII}$$

to find the exact values of:

1. $\sin(C+Q)$

4. $\sec(2C)$

2. $\cos(C-Q)$

5. $\cot(2C)$

3. $\tan(C+Q)$

6. $\csc 2C$

7. Prove: $\frac{\sec^2 \theta - 6 \tan \theta + 7}{\sec^2 \theta - 5} = \frac{\tan \theta - 4}{\tan \theta + 2}$

9. Solve exactly for $\theta \in [-180^\circ, 180^\circ)$:
 $16 \sin \theta \cos \theta = 4$

8. Prove:
 $\sin(A + 30^\circ) + \cos(A + 60^\circ) = \cos A$

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3. $\tan(2Q)$

6. $\csc(Q+C)$

7. Prove: $\sqrt{2} \sin\left(\frac{\pi}{4} - x\right) = \cos x - \sin x$

9. Prove: $\frac{1}{\tan x - \sec x} + \frac{1}{\tan x + \sec x} = \frac{-2}{\cot x}$

8. Solve for $\theta \in [0^\circ, 360^\circ]$: $\sin \theta = \sin 2\theta$

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6. $\csc(Q-C)$

7. Prove:

$$\cot^2 \phi - 1 = \cos 2\phi \cot^2 \phi + \cos 2\phi$$

9. Solve exactly for $x \in [0, \pi)$:

$$-\cos^2 4x = \sin^2 4x - 2 \sin\left(4x + \frac{\pi}{2}\right)$$

8. Solve for $\theta \in [0^\circ, 180^\circ)$:

$$\tan \theta + \tan 2\theta = 1 - \tan \theta \tan 2\theta$$

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2. $\cos(Q-C)$

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3. $\tan(C-Q)$

6. $\csc(2Q)$

7. Solve for $\theta \in [0^\circ, 360^\circ]$:

$$\cos \theta \cos 20^\circ - \sin \theta \sin 20^\circ = \frac{1}{\sqrt{2}}$$

9. Prove: $\frac{\cos x}{1 - \cos x} = \cot x \csc x + \cot^2 x$

8. Solve for $x \in [-180^\circ, 180^\circ]$:

$$\tan^2 x + 3 \sec x + 3 = 0$$