

For Problem 1-6, use:

(20, -21) is on the terminal side of C and

$$\sec Q = -\frac{13}{12} \text{ in QIII}$$

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: $\frac{\sec^2 \lambda + 3 \csc \lambda \sin \lambda - 5}{\tan^2 \lambda - 4 \tan \lambda + 3} = \frac{1 + \tan \lambda}{\tan \lambda - 3}$

9. Solve for A: $\cos^2(2A) - \sin^2(2A) = \frac{\sqrt{3}}{2}$

8. Solve exactly for $x \in [-120, 120^\circ]$:
 $\sec^2(3x) + \tan(3x) = 1$

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

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6. $\csc(Q+C)$

7. Prove:

$$\frac{1 - \csc \alpha}{2 \csc \alpha + 1} = \frac{\sin^2 \alpha + \cos^2 \alpha - \csc^2 \alpha}{2 \cot^2 \alpha + 3 \csc \alpha + 3}$$

9. Solve for $x \in [0, 60^\circ]$:

$$\frac{\cos x \cos 20^\circ - \sin x \sin 20^\circ}{\sin x \cos 20^\circ + \cos x \sin 20^\circ} = \sqrt{3}$$

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

10. Prove: $\cot A + \tan A = 2 \csc 2A$

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7. Prove: $1 - \frac{5}{2} \csc \theta = \frac{6 \sin^2 \theta - 19 \sin \theta + 10}{6 \sin^2 \theta - 4 \sin \theta}$

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

$$\csc \left(4x - \frac{\pi}{3} \right) = 2 + 2 \csc \left(4x - \frac{\pi}{3} \right)$$

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

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

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

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to find the exact values of:

1. $\sin(C-Q)$

4. $\sec(2Q)$

2. $\cos(Q-C)$

5. $\cot(2Q)$

3. $\tan(C-Q)$

6. $\csc(2Q)$

7. Prove: $\frac{\cos^4 x - \sin^4 x}{\cos^3 x - \sin^3 x} = -\frac{\cos x + \sin x}{1 + \sin x \cos x}$

9. Solve for $\theta \in [0^\circ, 360^\circ]$: $\cos \theta \sin \theta = \frac{\sqrt{3}}{4}$

8. Solve for $x \in [-360^\circ, 360^\circ]$:
 $3 - 3\sin x - 2\cos^2 x = 0$

10. Prove: $\frac{\sin x}{\csc x} + \frac{\cos x}{\sec x} = 1$