

**Non-Calculator****Simplify the trigonometric expression:**

1)  $\sin \alpha \tan \alpha \sec \alpha \csc \alpha$

2)  $\frac{(\cot \theta)^2}{1 - (\sin \theta)^2}$

3)  $\frac{\sin 2\beta}{\cos 2\beta - \cos^2 \beta}$

4)  $\frac{2}{1 - \csc \gamma} - \frac{2}{1 + \csc \gamma}$

5)  $1 - 4\sin^2 \theta \cos^2 \theta$

6)  $2 \sin \alpha \cos^3 \alpha + 2 \sin^3 \alpha \cos \alpha$

**Prove the identity:**

$$7) \tan^2 x - \sin^2 x = \sin^2 x \tan^2 x$$

$$8) \frac{\cos \sigma}{1 - \tan \sigma} + \frac{\sin \sigma}{1 - \cot \sigma} = \cos \sigma + \sin \sigma$$

$$9) \sec x - \sin x \tan x = \cos x$$

$$10) \cos^2 2\theta - \cos^2 \theta = \sin^2 \theta - \sin^2 2\theta$$

**Solve the equation on the interval  $[0, 2\pi]$ :**

$$11) \cos 2x = \cos x$$

$$12) \sqrt{2} \sec x \sin x = \sec x$$

$$13) 3\tan^2 \theta = 1$$

**Find the exact value of  $x$ :**

$$14) \sin \frac{5\pi}{12} = x$$

$$15) \cos \frac{11\pi}{12} = x$$

### Calculator

**Solve for  $x$  on the interval  $[0, 2\pi]$ . Round to the nearest thousandth (3 decimal places).**

$$16) \sin^2 x + 0.5 = 3 \cos x$$

$$17) x^2 = 10 - \sin^4 x$$

**Prove or disprove the identity graphically and algebraically.**

$$18) \sin 4\theta = 2 \sin 2\theta \cos 2\theta$$

$$19) \csc x + \cot x = \frac{\sin x}{1 + \cos x}$$

In  $\Delta ABC$ , round to the nearest thousandth (3 decimal places).

20) Solve the triangle given  $m\angle A = 79^\circ$ ,  $m\angle B = 33^\circ$ , and  $a = 7$ .

21) Solve the triangle given  $a = 5$ ,  $b = 8$ , and  $m\angle B = 30^\circ$ .

22) Find  $m\angle A$  given  $a = 5$ ,  $b = 7$ , and  $c = 6$ .

23) Solve  $\Delta ABC$  given  $a = 6$ ,  $b = 7$ , and  $m\angle A = 30^\circ$ .