Sum and Difference Formulas

$$\sin(u + v) = \sin u \cos v + \cos u \sin v$$

$$\cos(u + v) = \cos u \cos v - \sin u \sin v$$

$$\tan(u + v) = \frac{\tan u + \tan v}{1 - \tan u \tan v}$$

Double-Angle Formulas

$$\sin 2u = 2 \sin u \cos u$$

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

$$\cos 2u = \cos^2 u - \sin^2 u$$
$$= 2 \cos^2 u - 1$$
$$= 1 - 2 \sin^2 u$$

Half-Angle Formulas

$$\sin \frac{u}{2} = \pm \sqrt{\frac{1 - \cos u}{2}}$$

$$\cos \frac{u}{2} = \pm \sqrt{\frac{1 + \cos u}{2}}$$

$$\tan \frac{u}{2} = \frac{1 - \cos u}{\sin u} = \frac{\sin u}{1 + \cos u}$$

The signs of $\sin \frac{u}{2}$ and $\cos \frac{u}{2}$ depend on the quadrant in which $\frac{u}{2}$ lies.

Power-Reducing Formulas

$$\sin^2 u = \frac{1 - \cos 2u}{2}$$

$$\cos^2 u = \frac{1 + \cos 2u}{2}$$

$$\tan^2 u = \frac{1 - \cos 2u}{1 + \cos 2u}$$

Product-to-Sum Formulas

$$\sin u \sin v = \frac{1}{2}[\cos(u - v) - \cos(u + v)]$$

$$\cos u \cos v = \frac{1}{2}[\cos(u - v) + \cos(u + v)]$$

$$\sin u \cos v = \frac{1}{2}[\sin(u + v) + \sin(u - v)]$$

Sum-to-Product Formulas

$$\sin u + \sin v = 2 \sin\left(\frac{u + v}{2}\right) \cos\left(\frac{u - v}{2}\right)$$

$$\cos u + \cos v = 2 \cos\left(\frac{u + v}{2}\right) \cos\left(\frac{u - v}{2}\right)$$

1. –/1 points LarTrig9 2.5.008.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$6 \sin 2x \sin x = 6 \cos x$

2. –/1 points LarTrig9 2.5.007.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$\sin 2x + \sin x = 0$

3. –/1 points LarTrig9 2.5.009.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$\cos 2x + \cos x = 0$

4. –/1 points LarTrig9 2.5.010.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$\cos 2x + \sin x = 0$

5. –/1 points LarTrig9 2.5.011.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$\sin 4x = -2 \sin 2x$

6. –/1 points LarTrig9 2.5.013.

Find the exact solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$6 \tan 2x - 6 \cot x = 0$

7. –/3 points LarTrig9 2.5.021.

Find the exact values of sin $2u$, cos $2u$, and tan $2u$ using the double-angle formulas

$\sin u = -4/5, \quad 3\pi/2 < u < 2\pi$

8. –/3 points LarTrig9 2.5.024.

Find the exact values of sin $2u$, cos $2u$, and tan $2u$ using the double-angle formulas.

$\sec u = -2, \quad \pi/2 < u < \pi$

9. –/1 points LarTrig9 2.5.027.MI.

Use the power-reducing formulas as many times as possible to rewrite the expression in terms of the first power of the cosine.

$7\cos^4 x$

10. –/1 points LarTrig9 2.5.031.

Use the power-reducing formulas as many times as possible to rewrite the expression in terms of the first power of the cosine.

$\sin^2 5x \cos^2 5x$

11. –/4 points LarTrig9 2.5.039.

Consider the following.

$\tan u = -7/24, \quad 3\pi/2 < u < 2\pi$

(a) Determine the quadrant in which $u/2$ lies.

(b) Find the exact values of $\sin(u/2)$, $\cos(u/2)$, and $\tan(u/2)$ using the half-angle formulas.

12. –/1 points LarTrig9 2.5.041.

Use the half-angle formulas to simplify the expression.

$$\sqrt{\frac{1 - \cos 8x}{2}}$$

13. –/2 points LarTrig9 2.5.045.

Find all solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$$\sin \frac{x}{2} + \cos x = 0$$

14. –/1 points LarTrig9 2.5.059.

Use the sum-to-product formulas to find the exact value of the expression.

$$6\cos\frac{3\pi}{4} - 6\cos\frac{\pi}{4}$$

15. –/2 points LarTrig9 2.5.061.

Find all solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.)

$$\sin 6x + \sin 2x = 0$$

16. –/2 points LarTrig9 2.5.064.

Find all solutions of the equation in the interval $[0, 2\pi)$. (Enter your answers as a comma-separated list.

$$\sin^2 3x - \sin^2 x = 0$$

Use a graphing utility to graph the equation and verify the solutions.