

1. Evaluate. (Leave as exact answers.)

a)  $\cos\left(\frac{23\pi}{12}\right)$       b)  $\sin\left(\frac{19\pi}{12}\right)$       c)  $\cos\left(\frac{5\pi}{8}\right)$       d)  $\sin\left(\frac{7\pi}{8}\right)$

2. Solve for  $\theta$ ,  $0 \leq \theta \leq 2\pi$ . State exact answers where possible. Otherwise, round to 4 decimal places.

a)  $\sin(2\theta) = -0.6438$       b)  $\sec^2(\theta) = 2$       c)  $\tan(2\theta) = -2.5468$   
 d)  $6\cos^2(\theta) + 2\sin(\theta) - 1 = 0$       e)  $\sin(2\theta) - 2\cos(\theta) = 0$       f)  $5\sec^2(2\theta) + 7\sec(2\theta) - 12 = 0$

3. Prove each identity.

a)  $\frac{\sin(2\theta) - 2\sin^2(\theta)}{\cos(2\theta)} = \frac{2\sin(\theta)}{\cos(\theta) + \sin(\theta)}$       b)  $\frac{\sin(2\theta)}{\sin(\theta)} - \frac{\cos(2\theta)}{\cos(\theta)} = \frac{1}{\cos(\theta)}$   
 c)  $\sin(x)\sin(y) = \frac{1}{2}[\cos(x-y) - \cos(x+y)]$       d)  $\cos(x+y)\cos(x-y) = \cos^2(y) - \sin^2(x)$

**Answers:**

1. a)  $\frac{1+\sqrt{3}}{2\sqrt{2}}$       b)  $\frac{-1-\sqrt{3}}{2\sqrt{2}}$       c)  $-\sqrt{\frac{-1+\sqrt{2}}{2\sqrt{2}}}$       d)  $\sqrt{\frac{-1+\sqrt{2}}{2\sqrt{2}}}$   
 2. a) 1.2211, 2.7918, 4.3627, 5.9334      b)  $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$       c) 0.9725, 2.5433, 4.1141, 5.6849  
 d) 4.0069, 5.4179      e)  $\frac{\pi}{2}, \frac{3\pi}{2}$       f)  $0, \pi, 2\pi, 1.0003, 2.1413, 4.1419, 5.2829$

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