

Math 29
PAL Worksheet 24

1. Use the sum formulas for cosine and sine to find the exact value of $\cos\left(\frac{5\pi}{12}\right)$ and $\sin\left(\frac{5\pi}{12}\right)$. Hint: $\frac{5\pi}{12} = \frac{\pi}{4} + \frac{\pi}{6}$.
2. Use the difference formula for the cosine to verify the identity $\cos(\pi - \theta) = -\cos \theta$. Use the definition of the cosine, and the symmetry of the unit circle to explain why this identity holds.
3. Suppose θ is an angle in Quadrant I with $\sin \theta = \frac{4}{5}$. Find $\sin 2\theta$.
4. Find the exact value of $\cos\left(\frac{\alpha}{2}\right)$ and $\sin\left(\frac{\alpha}{2}\right)$ given that $\sin \alpha = -\frac{7}{25}$ and $\pi < \alpha < \frac{3\pi}{2}$.
5. Use the half angle formula to find the exact value of $\cos\left(\frac{7\pi}{8}\right)$.
6. Use the sum formula for the sine to find the exact value of $\sin\left(\frac{5\pi}{12}\right)$. Next, use the half angle formula for sine to find the exact value of $\sin\left(\frac{5\pi}{12}\right)$. Verify that your two answers are indeed equal to each other.