Cofunction Identities

1. Write each of the following in terms of the cofunction identity.

   a) $\sin\dfrac{\pi}{6}$ b) $\sin\dfrac{2\pi}{5}$ c) $\sin\dfrac{5\pi}{8}$

   d) $\cos\dfrac{3\pi}{4}$ e) $\cos\dfrac{2\pi}{9}$ f) $\cos\dfrac{7\pi}{36}$

2. a) Verify your results from #1 {b c e f} with a calculator.
   b) Verify your results from #1 {a d} without using a calculator.

3. Write $\csc\dfrac{2\pi}{3}$ in terms of secant. Recall that cosecant is the reciprocal of the sine function and secant is the reciprocal of the cosine function.

4. Express cscx using an equivalent trigonometric expression involving secant.

5. Express secx using an equivalent trigonometric expression involving cosecant.

6. a) Verify your results in #4 graphically.
   b) Verify your results in #5 graphically.

7. a) Graph y = cotx
   b) Reflect y = cotx in the y – axis.
   c) What phase shift is required to your graph in part (b) to obtain the graph of y = tanx?
   d) Write a cofunction identity relating tangent and cotangent. We are not looking for $\tan x = \dfrac{1}{\cot x}$.

8. a) Graph y = tanx
   b) Reflect y = tanx in the y – axis.
   c) What phase shift is required to your graph in part (b) to obtain the graph of y = cotx?
   d) Write a cofunction identity relating cotangent and tangent. We are not looking for $\cot x = \dfrac{1}{\tan x}$.

9. Write a summary of the cofunction identities.

Answers: 1. a) $\cos\dfrac{\pi}{3}$ b) $\cos\dfrac{\pi}{10}$ c) $\cos\left(-\dfrac{\pi}{8}\right)$ d) $\sin\left(-\dfrac{\pi}{4}\right)$ e) $\sin\left(\dfrac{5\pi}{18}\right)$ f) $\sin\left(\dfrac{11\pi}{36}\right)$ 3. $\sec\left(\dfrac{\pi}{2}-\dfrac{2\pi}{3}\right)=\sec\left(\dfrac{-\pi}{6}\right)$.

4. $\sec\left(\dfrac{\pi}{2}-x\right)$ 5. $\csc\left(\dfrac{\pi}{2}-x\right)$ 7. d) $\tan x=\cot\left(\dfrac{\pi}{2}-x\right)$ 8. d) $\cot x=\tan\left(\dfrac{\pi}{2}-x\right)$

9. $\sin x=\cos\left(\dfrac{\pi}{2}-x\right)$, $\cos x=\sin\left(\dfrac{\pi}{2}-x\right)$, $\csc x=\sec\left(\dfrac{\pi}{2}-x\right)$, $\sec x=\csc\left(\dfrac{\pi}{2}-x\right)$, $\tan x=\cot\left(\dfrac{\pi}{2}-x\right)$, $\cot x=\tan\left(\dfrac{\pi}{2}-x\right)$