

Week 4 Practice Worksheet

Inverse Trig Functions and Solving Trig Equations

You should complete all of these problems *without a calculator* in order to prepare for the Midterm which is a no-calculator exam.

1. Find the exact value of each of the following expressions; do not use a calculator. Be sure to use proper notation to *directly communicate* what the given expressions equal.

a. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

b. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

c. $\sin^{-1}\left(-\frac{1}{2}\right)$

d. $\cos^{-1}(0)$

e. $\tan^{-1}(-\sqrt{3})$

f. $\tan^{-1}(-1)$

2. Find the exact value of each of the following expressions; do not use a calculator. Be sure to use proper notation to **directly communicate** what the given expressions equal.

a. $\sin\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$

b. $\cos\left(\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right)$

c. $\cos^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right)$

d. $\sin^{-1}\left(\sin\left(\frac{4\pi}{3}\right)\right)$

e. $\sin\left(\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right)$

3. Find the exact value of each of the following expressions; do not use a calculator. Be sure to use proper notation to **directly communicate** what the given expressions equal.

a. $\sin^{-1}\left(\cos\left(-\frac{\pi}{6}\right)\right)$

b. $\tan^{-1}\left(\tan\left(\frac{2\pi}{3}\right)\right)$

c. $\cos^{-1}\left(\tan\left(\frac{3\pi}{4}\right)\right)$

d. $\tan^{-1}\left(\sin\left(\frac{\pi}{2}\right)\right)$

e. $\sin\left(\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)\right)$

4. Find the exact value of each of the following expressions; do not use a calculator. Be sure to use proper notation to **directly communicate** what the given expressions equal.

a. $\sin^{-1}\left(\sin\left(\frac{7\pi}{8}\right)\right)$

b. $\cos^{-1}\left(\cos\left(\frac{7\pi}{5}\right)\right)$

c. $\sin^{-1}\left(\sin\left(\frac{9\pi}{7}\right)\right)$

5. Find *all* of the solutions to the equations below; provide *exact* solutions.

a. $\sin(t) = -\frac{\sqrt{2}}{2}$

b. $2\cos(x) - \sqrt{3} = 0$

6. Find the solutions on the interval $[0, 2\pi)$ for the equations below; provide *exact* solutions.

a. $\cos(t) = -\frac{1}{2}$

b. $\frac{\sin(x)}{2} - \frac{\sqrt{3}}{4} = 0$

7. Find *all* of the solutions to the equations below; provide *exact* solutions.

a. $\sin(6t) = -\frac{\sqrt{3}}{2}$

b. $5 + 4\cos(2\theta) = 1$

c. $16\cos(4x) + 11 = 3$

d. $16 - 24\sin(8t) = 4$

8. Find the solutions on the interval $[0, 2\pi)$ to following equations.

a. $5 + 4\cos(2\theta) = 1$

b. $4 - 6\sin(2x) = 7$

c. $6\sqrt{2}\cos(3\alpha) + 10 = 4$