

$$\begin{pmatrix} \frac{\sqrt{3}}{2}, \frac{1}{2} \\ \frac{1}{2}, \frac{\sqrt{3}}{2} \end{pmatrix}$$

$$1. \sin^{-1}\left(\frac{1}{2}\right) \boxed{\frac{\pi}{6}, \frac{5\pi}{6}}$$

$$2. \cos^{-1}\left(\frac{1}{2}\right) \boxed{\frac{\pi}{3}, \frac{5\pi}{3}}$$

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

$$\boxed{\frac{\pi}{6}, \frac{7\pi}{6}}$$

$$4. \arccos\left(\frac{\sqrt{3}}{2}\right) \boxed{\frac{\pi}{6}, \frac{11\pi}{6}}$$

$$5. \arcsin\left(\frac{\sqrt{2}}{2}\right) \boxed{\frac{\pi}{4}, \frac{3\pi}{4}}$$

$$6. \text{Arctan}(1) \boxed{\frac{\pi}{4}, \frac{5\pi}{4}}$$

$$7. \sin^{-1}\left(-\frac{1}{2}\right) \boxed{\frac{7\pi}{6}, \frac{11\pi}{6}}$$

$$8. \cos^{-1}\left(-\frac{1}{2}\right) \boxed{\frac{2\pi}{3}, \frac{4\pi}{3}}$$

$$9. \arctan\left(-\frac{1}{\sqrt{3}}\right) \begin{pmatrix} \frac{\sqrt{3}}{2}, \frac{1}{2} \\ \frac{1}{2}, \frac{\sqrt{3}}{2} \end{pmatrix}$$

$$\boxed{\frac{5\pi}{6}, \frac{11\pi}{6}}$$

$$10. \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) \boxed{\frac{5\pi}{6}, \frac{7\pi}{6}}$$

$$11. \sin^{-1}\left(\frac{\sqrt{2}}{2}\right) \boxed{\frac{\pi}{4}, \frac{3\pi}{4}}$$

$$12. \tan^{-1}(-1) \boxed{\frac{3\pi}{4}, \frac{7\pi}{4}}$$

$$13. \sin^{-1} 0 \boxed{0, \pi}$$

$$14. \cos^{-1} 0 \boxed{\frac{\pi}{2}, \frac{3\pi}{2}}$$

$$15. \tan^{-1}(-\sqrt{3}) \boxed{\frac{2\pi}{3}, \frac{5\pi}{3}}$$

$$16. \arcsin(1) \boxed{\frac{\pi}{2}}$$

$$17. \text{Arccos}(1) \boxed{0}$$

$$18. \tan^{-1} 0 \boxed{0, \pi}$$

$$19. \text{arcsec}(-2) \boxed{\frac{2\pi}{3}, \frac{4\pi}{3}}$$

$$20. \csc^{-1}\left(-\frac{2}{\sqrt{3}}\right) \frac{\sqrt{3}}{\sqrt{3}}$$

Same as $\frac{2\sqrt{3}}{3}$ Look for $\frac{\sqrt{3}}{2}$

$$\boxed{\frac{4\pi}{3}, \frac{5\pi}{3}}$$

$$21. \cot^{-1}\left(\frac{1}{\sqrt{3}}\right) \boxed{\frac{\pi}{3}, \frac{4\pi}{3}}$$

$$22. \text{arccsc}(\text{undef})$$

Look for $\sin=0$

$$\boxed{0, \pi}$$

$$23. \text{Arccot}(1) \boxed{\frac{\pi}{4}, \frac{5\pi}{4}}$$

$$24. \sec^{-1}(\sqrt{2})$$

Look for $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$$\boxed{\frac{\pi}{4}, \frac{7\pi}{4}}$$

Composition (work from inside → out)

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

cos $\left(\begin{array}{l} \frac{\pi}{6}, \frac{5\pi}{6} \\ \frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2} \end{array} \right)$

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

$\cos^{-1}\left(\frac{1}{2}\right)$
 $\left(\frac{\pi}{3}, \frac{5\pi}{3} \right)$

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

$\frac{\pi}{3}, \frac{4\pi}{3}$ → $\sin\frac{4\pi}{3}$
 $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2} = -\frac{\sqrt{3}}{2}$

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

sin $\left(\begin{array}{l} \frac{\pi}{4}, \frac{7\pi}{4} \\ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \end{array} \right)$

29. $\sin^{-1}\left(\sin\left(\frac{7\pi}{4}\right)\right)$

$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) \rightarrow \left(\frac{5\pi}{4}, \frac{7\pi}{4} \right)$

32. $\cos\left(\tan^{-1}(-1)\right)$

$\frac{3\pi}{4}, \frac{7\pi}{4}$
 $\cos\frac{3\pi}{4} = -\frac{\sqrt{2}}{2}$
 $\cos\frac{7\pi}{4} = \frac{\sqrt{2}}{2}$

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

$\sin^{-1}\frac{1}{2}$
 $\left(\frac{\pi}{6}, \frac{5\pi}{6} \right)$

30. $\arccos\left(\sin\left(\frac{\pi}{3}\right)\right)$

$\cos^{-1}\frac{\sqrt{3}}{2} \rightarrow \left(\frac{\pi}{6}, \frac{11\pi}{6} \right)$

33. $\tan^{-1}(\cos(\pi))$

$\tan^{-1}(-1)$
 $\frac{y}{x}$
 $\left(\frac{3\pi}{4}, \frac{7\pi}{4} \right)$

**Inverse Trig Functions &
Composite Trig Functions Worksheet**

Name _____

Directions: Write the exact trigonometric value of the following problems.

1. $\cos^{-1} \frac{\sqrt{3}}{2}$

$\frac{\pi}{6}, \frac{11\pi}{6}$

2. $\sin^{-1} \frac{\sqrt{2}}{2}$

$\frac{\pi}{4}, \frac{3\pi}{4}$

3. $\arcsin(-1)$

$\frac{3\pi}{2}$

4. $\cos^{-1}(-1)$

π

5. $\arctan(1)$

$\frac{\pi}{4}, \frac{5\pi}{4}$

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

$\frac{3\pi}{4}, \frac{7\pi}{4}$

7. $\arcsin\left(-\frac{\sqrt{2}}{2}\right)$

$\frac{5\pi}{4}, \frac{7\pi}{4}$

8. $\tan^{-1} \sqrt{3}$

$\frac{\pi}{3}, \frac{4\pi}{3}$

9. $\arccos \frac{1}{2}$

$\pi/3, \frac{5\pi}{3}$

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

$\frac{5\pi}{6}, \frac{11\pi}{6}$

11. $\arccos\left(-\frac{\sqrt{2}}{2}\right)$

$\frac{3\pi}{4}, \frac{5\pi}{4}$

12. $\cos^{-1} 0$

$\frac{\pi}{2}, \frac{3\pi}{2}$

13. $\tan^{-1}(0)$

$0, \pi$

14. $\sin^{-1} 0$

$0, \pi$

15. $\cos^{-1} 1$

$0,$

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

$\frac{\pi}{3}, \frac{2\pi}{3}$
 $\swarrow \quad \searrow$
 $\frac{1}{2} \quad -\frac{1}{2}$

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

$\frac{2\pi}{3}, \frac{4\pi}{3}$
 $\swarrow \quad \searrow$
 $+\frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}$

18. $\tan(\sin^{-1} 0)$

$0, \pi$
 $\swarrow \quad \searrow$
 $0 \quad 0$

$$19. \cot(\cos^{-1} 0)$$

$$\cot\left(\frac{\pi}{2}, \frac{3\pi}{2}\right)$$

\swarrow \searrow
 0 0

$$22. \cos^{-1}\left(\sin\left(\frac{\pi}{6}\right)\right)$$

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

$$\frac{\pi}{3}, \frac{5\pi}{3}$$

$$25. \tan^{-1}\left(\cos\left(\frac{\pi}{2}\right)\right)$$

$$\tan^{-1}(0)$$

$$0, \pi$$

$$23. \cos\left(\sin^{-1}\left(\frac{1}{2}\right)\right)$$

$$\cos\left(\frac{\pi}{6}, \frac{5\pi}{6}\right)$$

\swarrow
 $\frac{\sqrt{3}}{2}, \frac{-\sqrt{3}}{2}$

$$31. \sin^{-1}\left(\cos\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)\right)$$

$$\cos\left(\frac{\pi}{3}, \frac{2\pi}{3}\right)$$

\swarrow \searrow
 $\frac{1}{2}$ $\frac{-1}{2}$

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

$$\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$20. \sin^{-1}\left(\cos\left(\frac{7\pi}{6}\right)\right)$$

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

$$\frac{4\pi}{3}, \frac{5\pi}{3}$$

$$23. \sin^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right)$$

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

$$\frac{\pi}{6}, \frac{5\pi}{6}$$

$$26. \sin^{-1}\left(\sin\left(\frac{3\pi}{4}\right)\right)$$

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

$$\frac{\pi}{4}, \frac{3\pi}{4}$$

$$29. \sin\left(\cos^{-1}\left(\frac{1}{2}\right)\right)$$

$$\sin\left(\frac{\pi}{3}, \frac{5\pi}{3}\right)$$

\swarrow
 $\frac{\sqrt{3}}{2}, \frac{-\sqrt{3}}{2}$

$$32. \tan\left(\sin^{-1}\left(\cos\left(\frac{\pi}{2}\right)\right)\right)$$

$$\sin^{-1}(0)$$

$$\tan(0, \pi)$$

\swarrow
 $0, 0$

$$21. \cos^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right)$$

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

$$\frac{3\pi}{4}, \frac{5\pi}{4}$$

$$24. \tan^{-1}\left(\sin\left(\frac{\pi}{2}\right)\right)$$

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

$$\frac{\pi}{4}, \frac{5\pi}{4}$$

$$27. \cos^{-1}\left(\sin\left(-\frac{\pi}{3}\right)\right)$$

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

$$\frac{5\pi}{6}, \frac{7\pi}{6}$$

$$30. \tan\left(\cos^{-1}\left(\frac{-1}{2}\right)\right)$$

$$\tan\left(\frac{2\pi}{3}, \frac{4\pi}{3}\right)$$

\swarrow
 $-\sqrt{3}, \sqrt{3}$

