

$$\begin{aligned} \sin^{-1} &\rightarrow \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \\ \tan^{-1} &\rightarrow \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \\ \cos^{-1} &\rightarrow [0, \pi] \end{aligned}$$

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extra practice.

- ① $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$
- ② $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$
- ③ $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{6}$
- ④ $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$
- ⑤ $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) = \frac{\pi}{6}$
- ⑥ $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right) = -\frac{\pi}{6}$
- ⑦ $\sin(\cos^{-1}(-\frac{\sqrt{3}}{2})) = \sin(\frac{5\pi}{6}) = \frac{1}{2}$
- ⑧ $\cos^{-1}(\cos(\frac{4\pi}{3})) = \cos^{-1}(-\frac{1}{2}) = \frac{2\pi}{3}$
- ⑨ $\tan(\cos^{-1}(-\frac{1}{2})) = \tan(\frac{2\pi}{3}) = -\sqrt{3}$
- ⑩ $\cos(\tan^{-1}(-\frac{3}{4})) = \frac{4}{5}$

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$$\cos(\tan^{-1}(\frac{12}{5}))$$

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Chapter Review

Chpt8 Day7

Evaluate each:

1. $\sin^{-1}(\frac{-1}{2})$ $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 $-\frac{\pi}{6}$

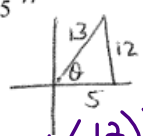
2. $\cos(\tan^{-1}1)$
 $\cos(\frac{\pi}{4}) = \frac{\sqrt{2}}{2}$

3. $\tan^{-1}(\frac{-\sqrt{3}}{3})$ $[-\frac{\pi}{2}, \frac{\pi}{2}]$
 $-\frac{\pi}{6}$

4. $\cos^{-1}(-1)$ $[0, \pi]$
 π

5. $\cos(\sin^{-1}\frac{\sqrt{2}}{2})$
 $\cos(\frac{\pi}{4}) = \frac{\sqrt{2}}{2}$

6. $\sin(\tan^{-1}(\frac{12}{5}))$
 $\sin \theta = \frac{12}{13}$



$\cos(\tan^{-1}(\frac{12}{5})) = \frac{5}{13}$

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Solve each equation for $[0, 2\pi)$. Exact values when possible

7. $4 \sin x = -1$

$$\sin x = -\frac{1}{4}$$

$$\text{ref } \angle = .2526$$

Quad 3, 4

$$\{3.3943, 6.0305\}$$

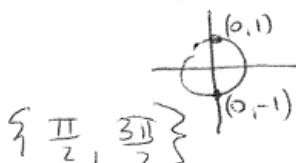
8. $3\csc^2 x - 1 = 2\csc^2 x$
 $-2\csc^2 x - 2\csc^2 x$

$$\csc^2 x - 1 = 0$$

$$\csc^2 x = 1$$

$$\sqrt{\sin^2 x} = \pm 1$$

$$\sin x = \pm 1$$



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9. $1 - 2\tan^2 \theta = -\tan \theta$

$$-2\tan^2 \theta + \tan \theta + 1 = 0$$

$$(-2\tan \theta - 1)(\tan \theta - 1) = 0$$

$$\{2.6779, 5.8195, \frac{\pi}{4}, \frac{5\pi}{4}\}$$

$$-2\tan \theta - 1 = 0$$

$$-2\tan \theta = 1$$

$$\tan \theta = -\frac{1}{2}$$

$$\text{ref } \angle = .4636$$

Quad 2, 4

$$\{2.6779, 5.8195\}$$

$$\tan \theta - 1 = 0$$

$$\tan \theta = 1$$

$$\text{ref } \angle = \frac{\pi}{4}$$

Quad I, III

10. $5 \sin \theta - \cos^2 \theta = 1$

$$5 \sin \theta - (1 - \sin^2 \theta) = 1 = 0$$

$$5 \sin \theta - 1 + \sin^2 \theta - 1 = 0$$

$$\sin^2 \theta + 5 \sin \theta - 2 = 0$$

Quadratic formula

$$\sin \theta = \frac{-5 \pm \sqrt{25 - 4(1)(-2)}}{2(1)}$$

$$\sin \theta = \frac{-5 \pm \sqrt{33}}{2}$$

$$\sin \theta = .3723$$

$$\text{ref } \angle = .3815$$

Quad 1, 2

$$\{.3815, 2.760\}$$

$$\sin \theta = -.3723$$

reject

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11. $3 \sin^2 x = 5 \sin x - 2 = 0$

$$(3 \sin x + 1)(\sin x - 2) = 0$$

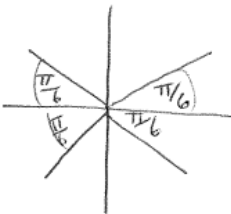
$3 \sin x + 1 = 0$ $\sin x = -\frac{1}{3}$ $\text{ref } \angle = .3398$ $Q = 3, 4$ $\{3.4814, 5.9433\}$	$\sin x = 2$ reject
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12. $4 \cos^2 x = 3$

$$\sqrt{\cos^2 x} = \sqrt{\frac{3}{4}}$$

$$\cos x = \pm \frac{\sqrt{3}}{2}$$

Quad 1, 2, 3, 4

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


13. $3 \sin 2x - \cos x = 0$

$$3(2 \sin x \cos x) - \cos x = 0$$

$$6 \sin x \cos x - \cos x = 0$$

$$\cos x (6 \sin x - 1) = 0$$

$$\left\{ \frac{\pi}{2}, \frac{3\pi}{2}, .1674, 2.9741 \right\}$$

$\cos x = 0$ Unit Circle $(-1, 0)$ $(1, 0)$ $\frac{\pi}{2}, \frac{3\pi}{2}$	$6 \sin x - 1 = 0$ $\sin x = \frac{1}{6}$ $\text{ref } \angle = .1674$ $Q: 1, 2$ $.1674, 2.9741$
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