

24 Inverse Trigonometric Functions

Concepts:

- Domain Restriction
- Inverse Sine
- Inverse Cosine
- Inverse Tangent

(Sections 7.4 & 7.5)

1. Find the exact value for expression or state that it is undefined.

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

(i) $\cos^{-1}\left(\frac{\sqrt{10}}{2}\right)$

(b) $\arcsin\left(-\frac{1}{2}\right)$

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

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

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

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

(l) $\cot^{-1}(-1)$

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

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

(f) $\arccos(0)$

(n) $\sin\left(\cos^{-1}\left(-\frac{2}{5}\right)\right)$

(g) $\cos(\cos^{-1}(2.3))$

(o) $\sin^{-1}\left(\sin\left(\frac{11\pi}{6}\right)\right)$

(h) $\cos^{-1}\left(\cos\left(-\frac{\pi}{6}\right)\right)$

(p) $\sec^{-1}(2)$

2. Find the exact value for expressions.

(a) $\sin\left(\cos^{-1}\left(-\frac{2}{5}\right)\right)$

(d) $\cos\left(\tan^{-1}\left(\frac{5}{6}\right)\right)$

(b) $\tan\left(\sin^{-1}\left(\frac{1}{4}\right)\right)$

(e) $\cot\left(\tan^{-1}\left(\frac{3}{8}\right)\right)$

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

(f) $\cos\left(\sec^{-1}\left(\frac{7}{3}\right)\right)$

3. Write as an algebraic expression for $\sin(\cos^{-1}(x))$ in terms of x .
4. Write an algebraic expression for $\cos(\tan^{-1}(2x))$ in terms of x .
5. Write an algebraic expression for $\cos(\cos^{-1}(x) + \sin^{-1}(x))$ in terms of x .
6. (Question # 21, Section 7.5) Find the exact solutions to $2 \sin(x) + 1 = 0$
7. Find all solutions to $\sec^2(x) - 2 = 0$
8. Use an appropriate substitution to find all the solutions to $2 \sin(2x) + \sqrt{3} = 0$
9. Find all the solutions to $2 \cos(3x) = -1$ in the interval $[0, 2\pi)$.
10. Find all possible solutions of $\cos(2\theta) = -5 \cos \theta - 4$ in the interval $[-\pi, 6\pi]$.
11. Find all possible solutions of $\cos(2\theta) = 4 - 3 \cos \theta$.
12. Find all possible solutions of $\cos(2\theta) = 4 - 5 \sin \theta$.
13. Find all possible solutions of $7 \tan x \sin x = -12 \sin x$, round your answers to the nearest tenth of a degree.
14. Let $\cos A = -\frac{24}{25}$ and $\sin B = \frac{5}{13}$, with $\pi < A < \frac{3\pi}{2}$ and $\frac{\pi}{2} < B < \pi$. Find the exact value of $\cos(A - B)$.