Inverse Trig Functions

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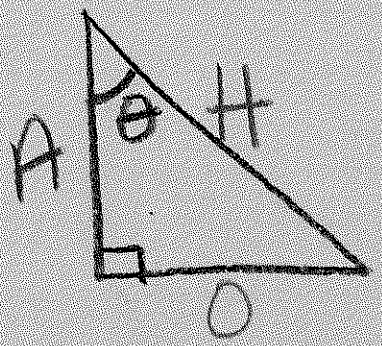
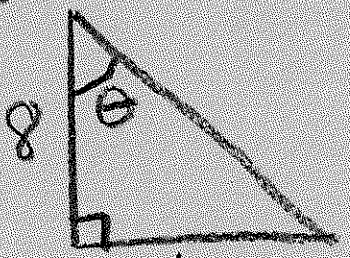


* When missing an angle, use inverses → $\sin^{-1}\left(\frac{O}{H}\right)=\theta$

$\cos^{-1}\left(\frac{A}{H}\right)=\theta$

$\tan^{-1}\left(\frac{O}{A}\right)=\theta$

Ex.



$\theta=$ _____

* When on Unit Circle, Find the angle/degree with given measure.

$\sin^{-1} \leftrightarrow \arcsin(y)=\theta \rightarrow [-90, 90] \rightarrow$ Quad I + IV

$\cos^{-1} \leftrightarrow \arccos(x)=\theta \rightarrow [0, 180] \rightarrow$ Quad I + II

$\tan^{-1} \leftrightarrow \arctan\left(\frac{y}{x}\right)=\theta \rightarrow [-90, 90] \rightarrow$ Quad I + IV

(you know coordinate, find angle)

Ex 1. $\cos^{-1}\left(\frac{1}{2}\right)=$ _____ 2. $\arcsin\left(\frac{\sqrt{3}}{2}\right)=$ _____

3. $\arctan\left(-\frac{\sqrt{3}}{3}\right)=$ _____ 4. $\tan^{-1}(1)=$ _____

5. $\sin^{-1}\left(-\sqrt{3}/2\right)=$ _____ 6. $\arccos\left(-\frac{\sqrt{3}}{2}\right)=$ _____

More Examples

7. $\arccos(\cos 180)$

8. $\sin(\arccos \frac{\sqrt{2}}{2})$

9. $\arctan(\tan \pi/6)$

10. $\sin(\arctan -\sqrt{3})$

11. $\tan(\arccos -\frac{1}{2})$

12. $\arcsin(\cos 90)$

6-4 Practice Worksheet

Inverse Trigonometric Functions

Write each equation in the form of an inverse relation.

1. $0.75 = \sin x$
2. $-1 = \cos x$
3. $0.1 = \tan \theta$
4. $\frac{3}{5} = \cos x$
5. $\sin x = \frac{\sqrt{3}}{2}$
6. $\cos \alpha = \frac{12}{13}$

Find the values of x that satisfy each equation.

7. $x = \arccos 1$
8. $\arccos \frac{\sqrt{2}}{2} = x$
9. $\arcsin \frac{1}{2} = x$
10. $\sin^{-1}(-1) = x$
11. $\sin^{-1} \frac{\sqrt{2}}{2} = x$
12. $\cot^{-1} 1 = x$

Evaluate each expression. Assume that all angles are in Quadrant I.

13. $\cos\left(\cos^{-1} \frac{1}{2}\right)$
14. $\sin\left(\cos^{-1} \frac{1}{2}\right)$
15. $\cos\left(\sin^{-1} \frac{1}{2}\right)$
16. $\tan\left(\sin^{-1} \frac{\sqrt{2}}{2} - \cos^{-1} \frac{\sqrt{2}}{2}\right)$

17. Verify that $\sin^{-1} \frac{\sqrt{3}}{2} + \sin^{-1} \frac{1}{2} = 90°$. Assume that all angles are in Quadrant I.

HW 

1. $\arcsin\left(\frac{1}{2}\right)$
2. $\arctan\left(\frac{\sqrt{3}}{3}\right)$
3. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
4. $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$
5. $\arctan(0)$
6. $\arccos(1)$
7. $\arcsin\left(\frac{\sqrt{2}}{2}\right) + \arccos\left(\frac{-\sqrt{2}}{2}\right)$
8. $\tan^{-1}(0) + \tan^{-1}(1)$
9. $\arctan(-\sqrt{3})$