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Graphs & Inverses of Trig Functions
7A – Inverse Trig Functions

Write each equation in the form of an inverse relation.

#1) $n = \sin\theta$

$\arcsin(n) = \theta$

#2) $\cos\beta = \frac{1}{3}$

$\beta = \cos^{-1}\left(\frac{1}{3}\right)$

#3) $\tan\varphi = \frac{3}{2}$

$\varphi = \tan^{-1}\left(\frac{3}{2}\right)$

#4) $\sin\alpha = 1$

$\alpha = \sin^{-1}(1)$

#5) $\cos\theta = y$

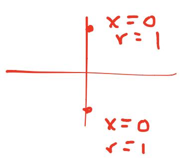
$\theta = \cos^{-1}(y)$

#6) $\tan\alpha = 2$

$\alpha = \tan^{-1}(2)$

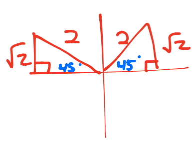
Find the values of θ in the interval $0° \le \theta < 360°$ that satisfy each equation.

#7) $\theta = \arccos(0)$



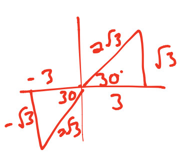
$\theta = 90°, 270°$

#8) $\theta = \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$



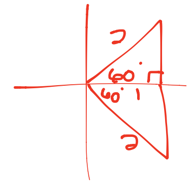
$\theta = 45°, 135°$

#9) $\theta = \arctan\left(\frac{\sqrt{3}}{3}\right)$



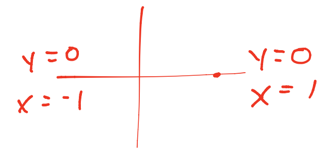
$\theta = 30°, 210°$

#10) $\theta = \operatorname{arcsec}(2)$



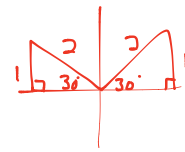
$\theta = 60°, 300°$

#11) $\theta = \tan^{-1}(0)$



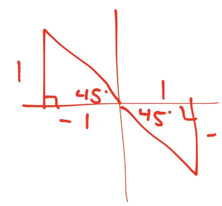
$\theta = 0°, 180°$

#12) $\theta = \arcsin\left(\frac{1}{2}\right)$



$\theta = 30°, 150°$

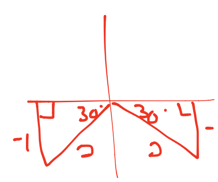
#13) $\theta = \operatorname{arccot}(-1)$



$\theta = 135°, 315°$

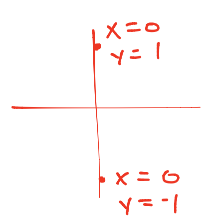
#14) $\theta = \arcsin(-0.5)$

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



$\theta = 210°, 330°$

#15) $\theta = \operatorname{arccot}(0)$



$\theta = 90°, 270°$

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Graphs & Inverses of Trig Functions

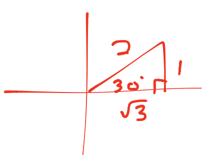
7A – Inverse Trig Functions

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

#16) $\sin\left(\arcsin\left(\frac{1}{2}\right)\right) = \frac{1}{2}$

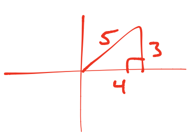
#17) $\cot\left(\tan^{-1}\left(\frac{4}{5}\right)\right) = \frac{5}{4}$

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



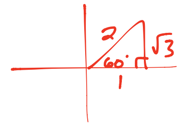
#19) $\sec\left(\cos^{-1}\left(\frac{1}{2}\right)\right) = 2$

#20) $\cos\left(\cot^{-1}\left(\frac{4}{3}\right)\right) = \frac{4}{5}$



Pythag Triple

#21) $\tan(\sec^{-1}(2)) = \sqrt{3}$

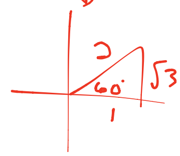


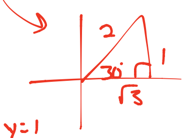
#22) $\sin(\arctan(\sqrt{3}) + \text{arccot}(\sqrt{3}))$

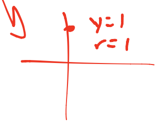
$= \sin(60° + 30°)$

$= \sin(90°)$

$= 1$



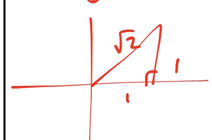




#23) $\sin(\tan^{-1}(1)) + \cos\left(\cos^{-1}\left(\frac{1}{2}\right)\right)$

$= \frac{\sqrt{2}}{2} + \frac{1}{2}$

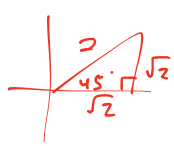
$= \frac{1+\sqrt{2}}{2}$



#24) $\tan\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right) - \cot\left(\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$

$= 1 - 1$

$= 0$



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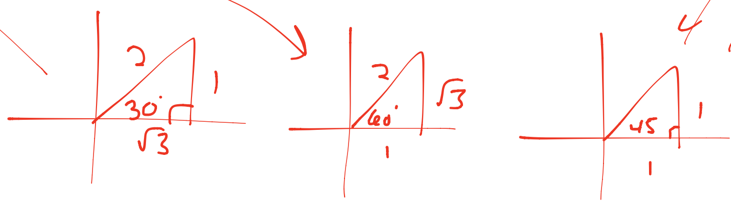
Graphs & Inverses of Trig Functions
7A – Inverse Trig Functions

Verify each equation. Assume that all angles are in Quadrant I. If an angle is not special, use your calculator to estimate.

#25) $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) + \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \tan^{-1}(1) + \cot^{-1}(1)$

$30^\circ + 60^\circ = 45^\circ + 45^\circ$

$90^\circ = 90^\circ$

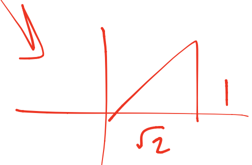


#26) $\arctan(\sqrt{2}) + \operatorname{arccot}(\sqrt{2}) = \arcsin\left(\frac{1}{2}\right) + \arccos\left(\frac{1}{2}\right)$

$54.7^\circ + 35.3^\circ = 30^\circ + 60^\circ$

$90^\circ = 90^\circ$

Not special!
use calc.



Not special!
use calc.

03/24/2015

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Graphs & Inverses of Trig Functions
7A – Inverse Trig Functions

#1) $\arcsin(n) = \theta$
#2) $\arcsin\left(\frac{1}{3}\right) = \beta$
#3) $\arctan\left(\frac{3}{2}\right) = \varphi$
#4) $\arcsin(1) = \alpha$
#5) $\arccos(y) = \theta$
#6) $\arctan(2) = \alpha$

#7) 90º, 270º
#8) 45º, 135º
#9) 30º, 210º
#10) 60º, 300º
#11) 0º, 180º
#12) 30º, 150º
#13) 135 º, 315º
#14) 210º, 330º
#15) 90º, 270º

#16) ½
#17) $\frac{5}{4}$
#18) ½
#19) 2
#20) $\frac{4}{5}$
#21) $\sqrt{3}$
#22) 1
#23) $\frac{\sqrt{2}+1}{2}$
#24) 0

#25) Work varies
#26) Work varies