# Trigonometric Inverses Practice

Name: _____ Date: _____

## Question 1

Solve in degrees (calculator)

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

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

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

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

V. $\csc^{-1}(2)$

VI. $\cot^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

## Question 2

Solve (calculator)

I. $\sin(\sin^{-1}0.3) =$

II. $\cos^{-1}[\cos(-45°)] =$

III. $\tan[\tan^{-1}(-4.2)] =$

IV. $\tan(\cos^{-1}(\sqrt{2}/2)] =$

V. $\sin^{-1}(\cos(\pi/6)] =$

VI. $\cos(\sin^{-1}(\sqrt{3}/2)] =$

VII. $\cos[\tan^{-1}(\sqrt{3})] =$

VIII. $\cot^{-1}[\cot(3\pi/4)] =$

# Trigonometric Inverses Practice

## Question 3

Solve (calculator)

I. $\cos\left(\sin^{-1}\frac{\sqrt{2}}{2} + \cos^{-1}\frac{3}{5}\right)$

II. $\sin\left(2\cos^{-1}\frac{3}{5}\right)$

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

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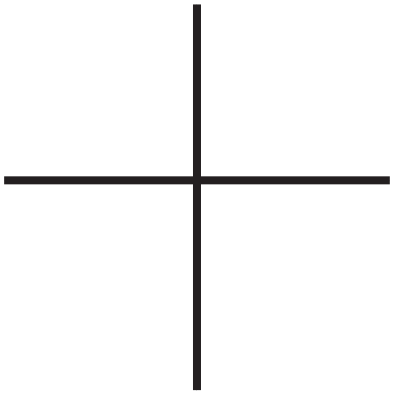
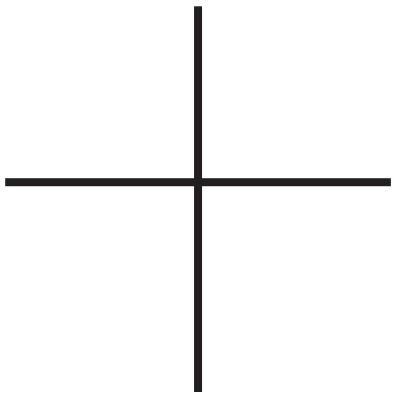
## Question 4

Simplify

I. $\sin(\tan^{-1}\frac{x}{3})$



II. $\sin(\cot^{-1}\frac{w}{2})$



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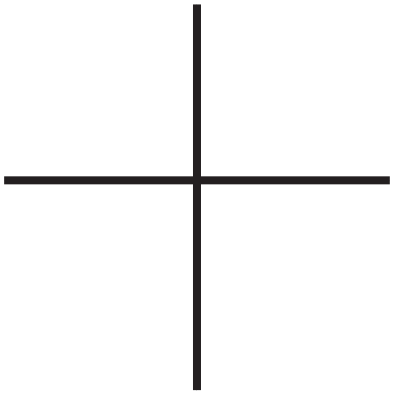
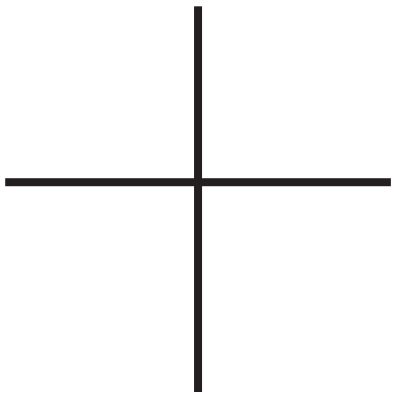
III. $\tan(\cos^{-1}\frac{3}{r})$



IV. $\cot(\sin^{-1}\frac{r}{t})$



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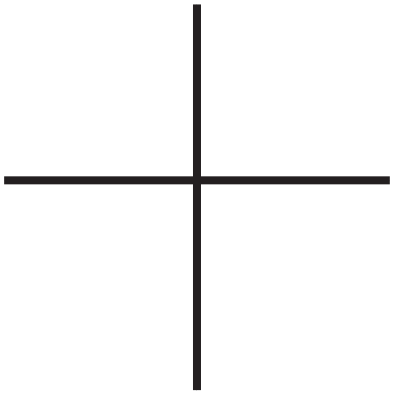
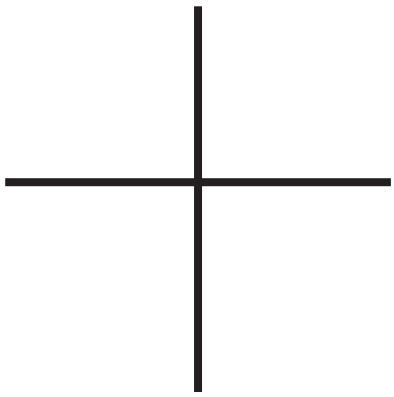
V. $\cos\left(\tan^{-1}\frac{x}{4}\right)$



VI. $\tan(\cos^{-1}x)$



# Trigonometric Inverses Practice

Name: **Key** Date: _____

## Question 1

Solve in degrees (calculator)

I. $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) \longrightarrow -60°$

restricted range : $[-90°, 90°]$

II. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right) \longrightarrow 45°$

restricted range : $[0°, 180°]$

III. $\tan^{-1}\left(\frac{\sqrt{3}}{3}\right) \longrightarrow 30°$

restricted range : $(-90°, 90°)$

IV. $\sec^{-1}(\sqrt{2}) \longrightarrow \cos^{-1}\left(\frac{1}{\sqrt{2}}\right) \longrightarrow 45°$

restricted range : $[0, 90°) \cup (90°, 180°]$

V. $\csc^{-1}(2) \longrightarrow \sin^{-1}\left(\frac{1}{2}\right) \longrightarrow 30°$

restricted range : $[-90°, 0) \cup (0, 90°]$

VI. $\cot^{-1}\left(-\frac{\sqrt{3}}{3}\right) \longrightarrow \tan^{-1}\left(\frac{1}{-\frac{\sqrt{3}}{3}}\right) \longrightarrow -60°$

restricted range : $(0°, 180°)$

not in restricted range

$180° + -60° = 120°$

VII. $\cot^{-1}(-\sqrt{3}) \longrightarrow \tan^{-1}\left(\frac{1}{-\sqrt{3}}\right) \longrightarrow -30°$

restricted range : $(0°, 180°)$

not in restricted range

$180° + -30° = 150°$

## Question 2

Solve (calculator)

I. $\sin(\sin^{-1} 0.3) = 0.3$

restricted domain: $[-1, 1]$

II. $\cos^{-1}[\cos(-45°)] = 45°$

restricted range: $[0°, 180°]$

III. $\tan[\tan^{-1}(-4.2)] = -4.2$

restricted domain: $(-\infty, \infty)$

IV. $\tan(\cos^{-1}(\sqrt{2}/2)] = 1$

V. $\sin^{-1}(\cos(\pi/6)] = \pi/3$

VI. $\cos(\sin^{-1}(\sqrt{3}/2)] = 1/2$

VII. $\cos[\tan^{-1}(\sqrt{3})] = 1/2$

VIII. $\cot^{-1}[\cot(3\pi/4)] = 3\pi/4$

restricted range : $(0°, 180°)$

$$\frac{1}{\tan(3\pi/4)} \rightarrow -1$$

$\tan^{-1}(1/-1) \rightarrow -\pi/4$

not in restricted range

$\pi + -\pi/4 = 3\pi/4$

# Trigonometric Inverses Practice

## Question 3

Solve (calculator)

I. $\cos\left(\sin^{-1}\frac{\sqrt{2}}{2} + \cos^{-1}\frac{3}{5}\right)$

$\downarrow$

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

$\downarrow$

$\frac{-\sqrt{2}}{10}$

II. $\sin\left(2\cos^{-1}\frac{3}{5}\right) \rightarrow \frac{24}{25}$

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

# Trigonometric Inverses Practice

## Question 4

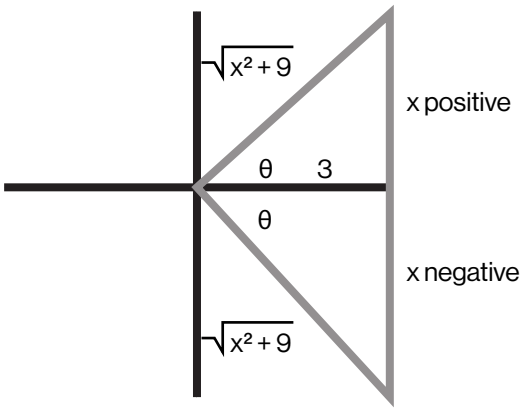
Simplify

I. $\sin(\tan^{-1}\frac{x}{3})$

restricted range: $(-\pi/2, \pi/2)$

restricted range: $(-90°, 90°)$

quadrants : I and IV



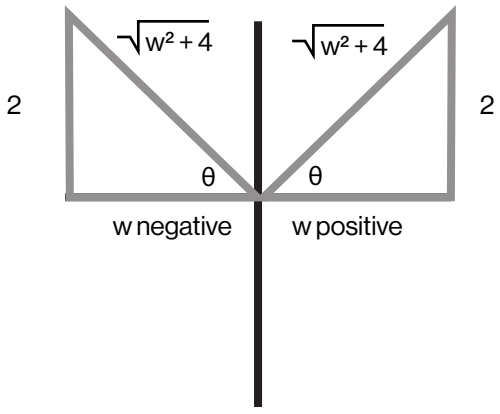

$\frac{x}{\sqrt{x^2+9}}$ sin = opp / hyp

II. $\sin(\cot^{-1}\frac{w}{2})$

restricted range: $(0, \pi)$

restricted range: $(0°, 180°)$

quadrants : I and II




$\frac{2}{\sqrt{w^2+4}}$ sin = opp / hyp

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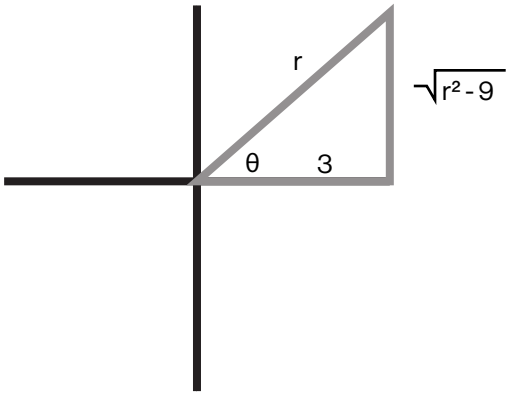
III. $\tan\left(\cos^{-1}\frac{3}{r}\right)$

restricted range: $[0, \pi]$

restricted range: $[0°, 180°]$

quadrants : I and II



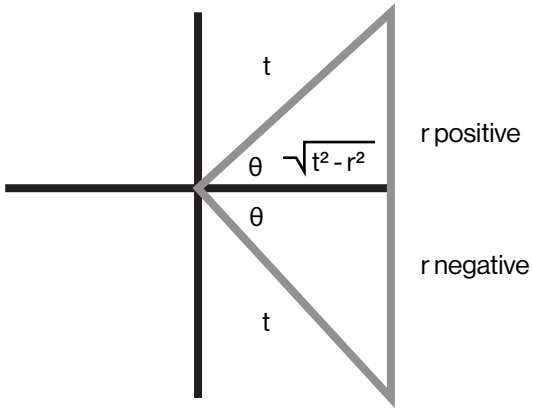

$\frac{\sqrt{r^2 - 9}}{3}$ tan = opp / adj

IV. $\cot\left(\sin^{-1}\frac{r}{t}\right)$

restricted range: $[-\pi / 2, \pi / 2]$

restricted range: $[-90°, 90°]$

quadrants : I and IV




$\frac{\sqrt{t^2 - r^2}}{r}$ cot = adj / opp

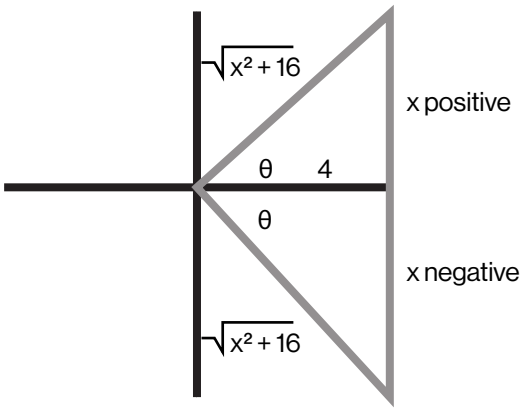
# Trigonometric Inverses Practice

V. $\cos(\tan^{-1}\frac{x}{4})$

restricted range: $(-\pi/2, \pi/2)$

restricted range: $(-90°, 90°)$

quadrants : I and IV



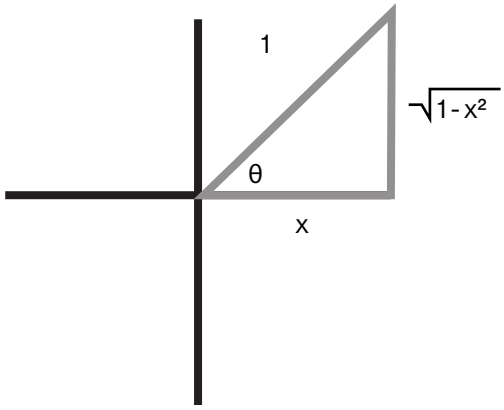

$\frac{4}{\sqrt{x^2+16}}$ cos = adj / hyp

VI. $\tan(\cos^{-1}x)$

restricted range: $[0, \pi]$

restricted range: $[0°, 180°]$

quadrants : I and II




$\frac{\sqrt{1-x^2}}{x}$ tan = opp / adj