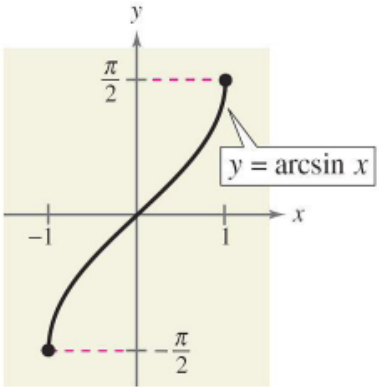
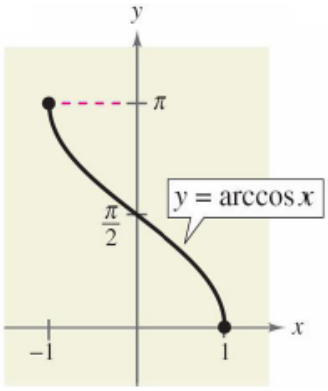
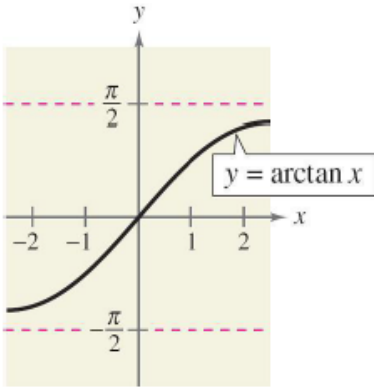
4.7 Inverse Trigonometric Functions - Part II



DOMAIN: [–1,1]
RANGE: $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$



DOMAIN: [–1,1]
RANGE: $[0, \pi]$



DOMAIN: $(-\infty, \infty)$
RANGE: $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

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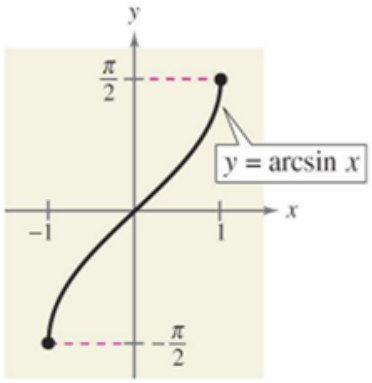
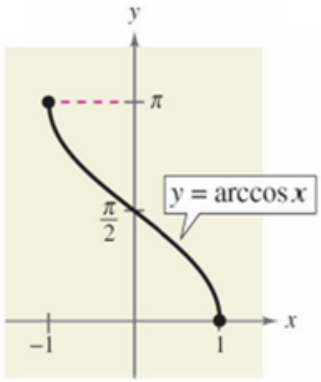
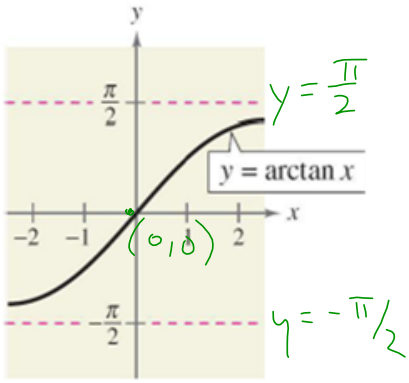
RULES FOR TRANSFORMATIONS OF FUNCTIONS

If $f(x)$ is the original function, $a > 0$ and $c > 0$:

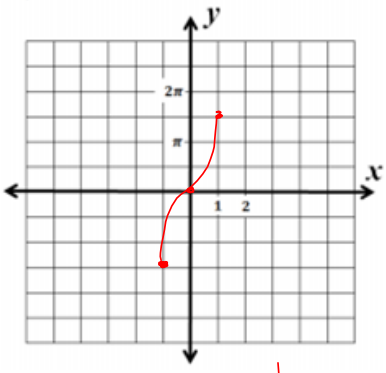
Function	Transformation of the graph of $f(x)$
$f(x)+c$	Shift $f(x)$ upward c units
$f(x)-c$	Shift $f(x)$ downward c units
$f(x+c)$	Shift $f(x)$ to the left c units
$f(x-c)$	Shift $f(x)$ to the right c units
$-f(x)$	Reflect $f(x)$ in the x-axis
$f(-x)$	Reflect $f(x)$ in the y-axis
$a \cdot f(x),\ a > 1$	Stretch $f(x)$ vertically by a factor of a.
$a \cdot f(x),\ 0 < a < 1$	Shrink $f(x)$ vertically by a factor of a.
$f(ax),\ a > 1$	Shrink $f(x)$ horizontally by a factor of $\frac{1}{a}$.
$f(ax),\ 0 < a < 1$	Stretch $f(x)$ horizontally by a factor of $\frac{1}{a}$.





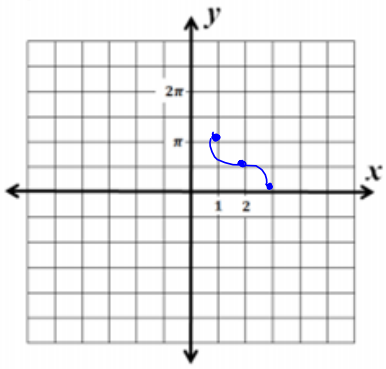


1) $y = 3\sin^{-1} x$



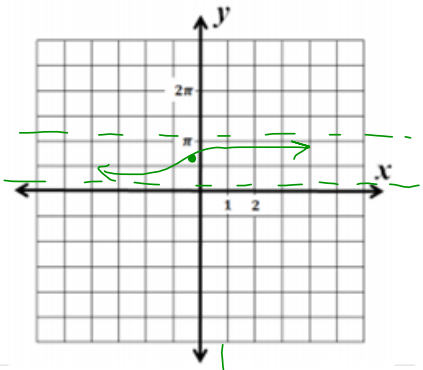
x	y	3y
−1	$-\pi/2$	$-3\pi/2$
0	0	0
1	$\pi/2$	$3\pi/2$

2) $y = \cos^{-1}(x - 2)$



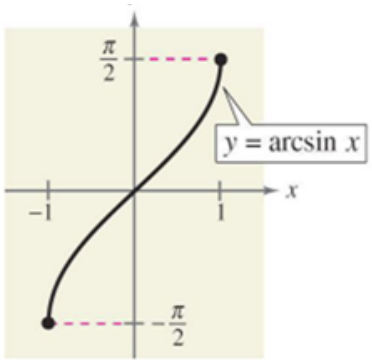
x	x+2	y
−1	1	π
0	2	$\pi/2$
1	3	0

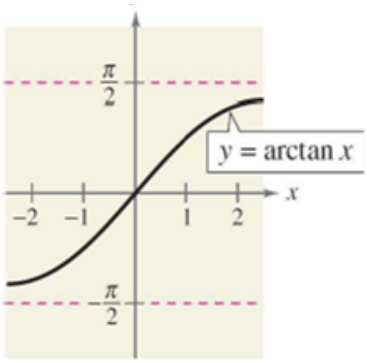
3) $y = \tan^{-1} x + \frac{\pi}{2}$



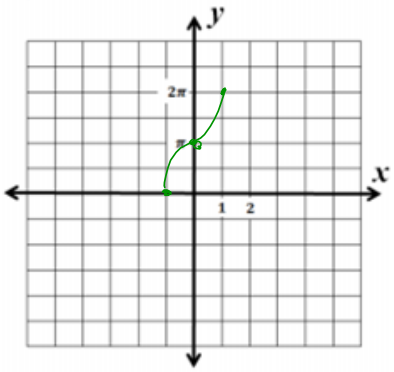
$y = \frac{\pi}{2}$ (0,0) $y = -\frac{\pi}{2}$

$y = \pi$ $(0, \pi/2)$ $y = 0$

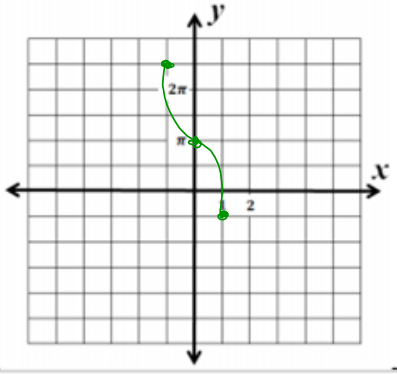




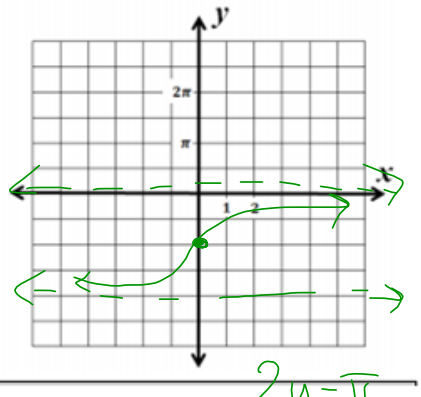
4) $y = 2\sin^{-1} x + \pi$



5) $y = 3\cos^{-1} x - \frac{\pi}{2}$



6) $y = 2\tan^{-1} x - \pi$



x	y	$2y + \pi$
-1	$-\frac{\pi}{2}$	0
0	0	π
1	$\frac{\pi}{2}$	2π

x	y	$3y - \frac{\pi}{2}$
-1	π	$\frac{5\pi}{2}$
0	$\frac{\pi}{2}$	π
1	0	$-\frac{\pi}{2}$

$2y - \pi$

* $y = \frac{\pi}{2}$ $(0, 0)$ 0

* $y = -\frac{\pi}{2}$ $(0, -\pi)$ -2π

If possible, find the exact value.

7.) $\tan\left(\arccos\frac{2}{3}\right)$

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If possible, find the exact value.

8.) $\cos\left(\arcsin\left(-\frac{3}{5}\right)\right)$

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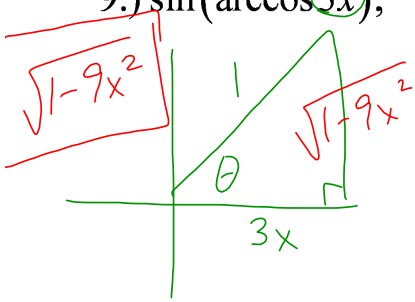
Write an algebraic expression that is equivalent to the expression.

9.) $\sin(\arccos 3x); \quad 0 \le x \le \frac{1}{3}$

O/H A/H



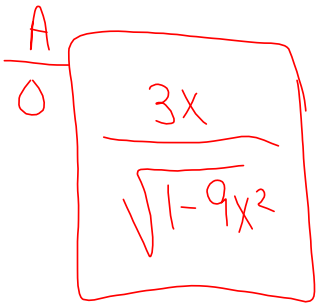
$(3x)^2 + b^2 = 1^2$

$9x^2 + b^2 = 1$

$b^2 = 1 - 9x^2$

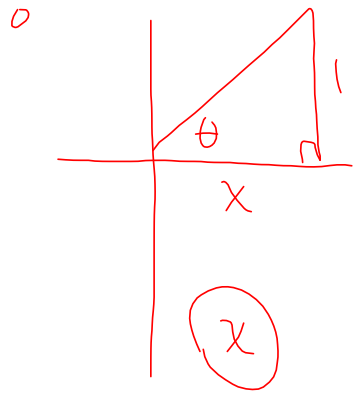
$b = \sqrt{1-9x^2}$

10.) $\cot(\arccos 3x); \quad 0 \le x \le \frac{1}{3}$



Write an algebraic expression that is equivalent to the expression.

11.) $\cot\left(\arctan\frac{1}{x}\right)$



$\sqrt{16+9}$

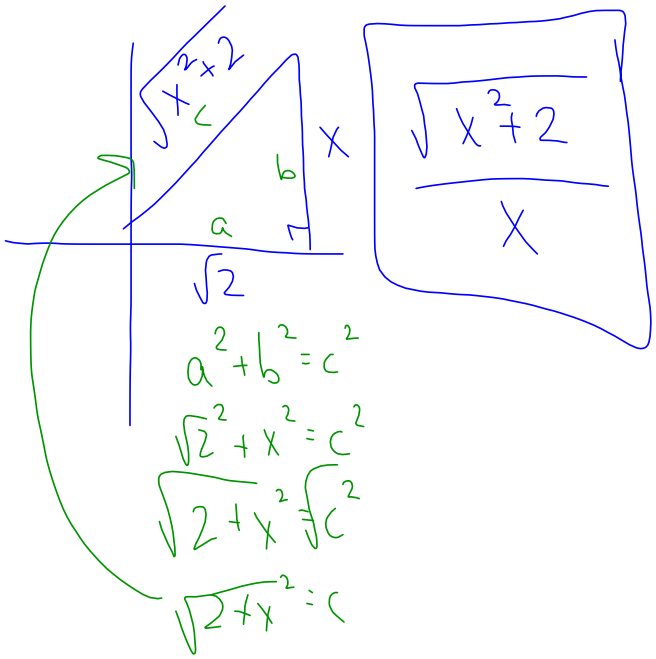
$\sqrt{25}=5$

$\sqrt{16}+\sqrt{9}$

$4+3$

7

12.) $\csc\left(\arctan\frac{x}{\sqrt{2}}\right)$



$\frac{\sqrt{x^2+2}}{x}$

$a^2+b^2=c^2$

$\sqrt{2}^2+x^2=c^2$

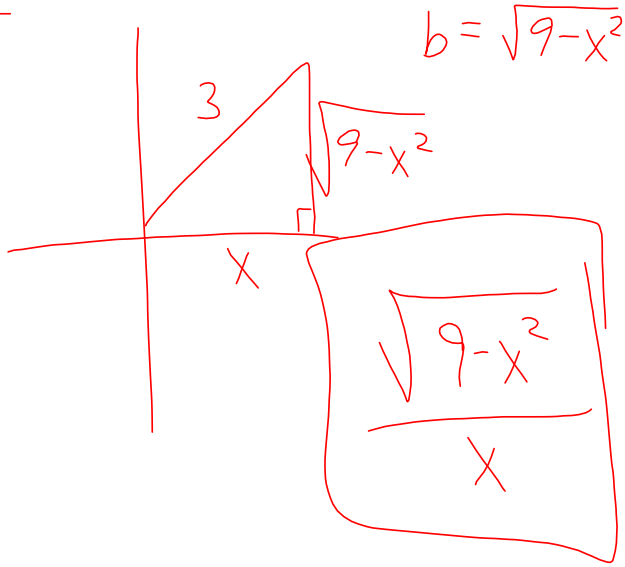
$\sqrt{2+x^2}=\sqrt{c^2}$

$\sqrt{2+x^2}=c$

Write an algebraic expression that is equivalent to the expression.

13.) $\tan\left(\arccos\frac{x}{3}\right)$

$\frac{O}{A}$



$x^2+b^2=3^2$

$b^2=9-x^2$

$b=\sqrt{9-x^2}$

$\frac{\sqrt{9-x^2}}{x}$

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