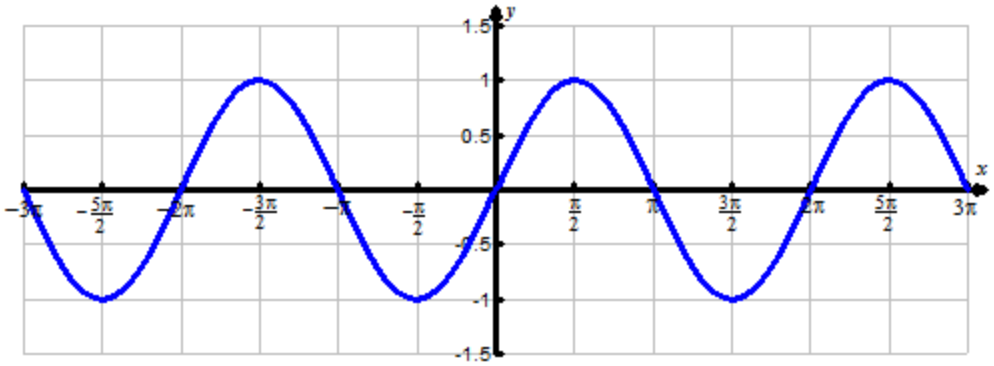
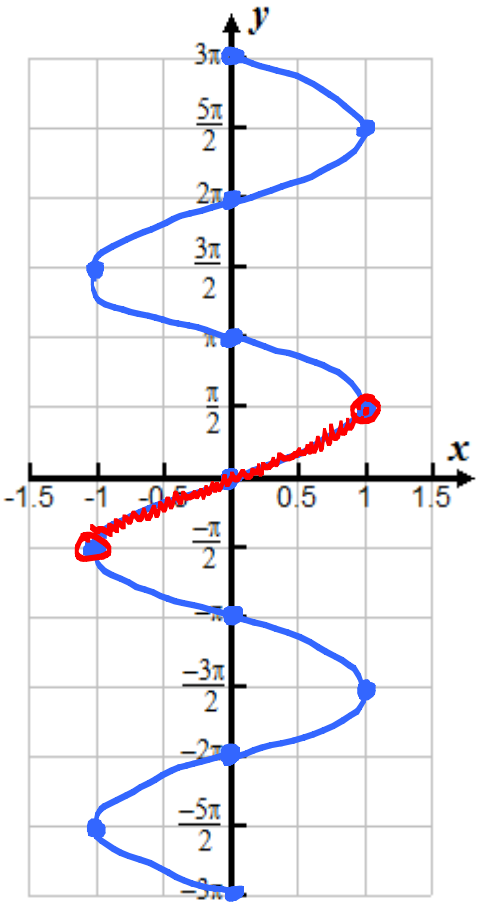
Consider the graph of the function *f(x) = sin(x)* shown below.



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

Using coordinate points of the graph to assist you and create a sketch of the inverse of *f(x) = sin(x).*

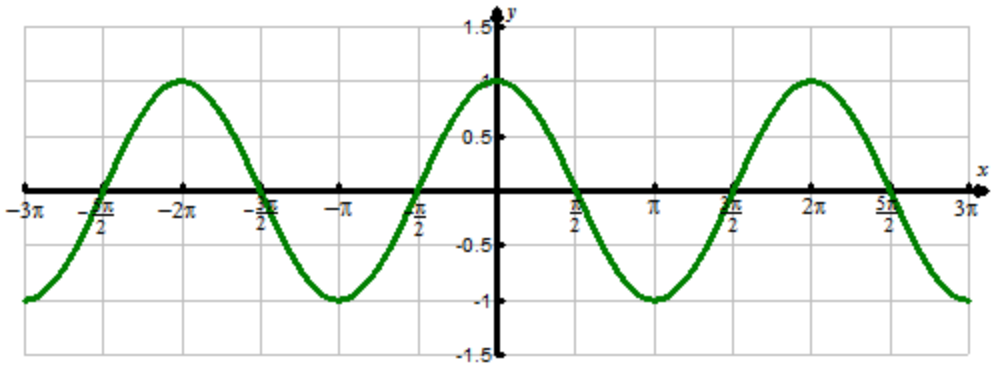


x	y
0	-2π
1	$-3\pi/2$
0	$-\pi$
-1	$-\pi/2$
0	0
1	$\pi/2$
0	π
-1	$3\pi/2$
0	2π

Explain whether or not the complete inverse of *f(x) = sin(x)* is a function. IT IS NOT. THE INVERSE GRAPH ABOVE FAILS THE VERTICAL LINE TEST WHICH SUGGESTS THERE ARE MULTIPLE OUTPUTS FOR A GIVEN INPUT.

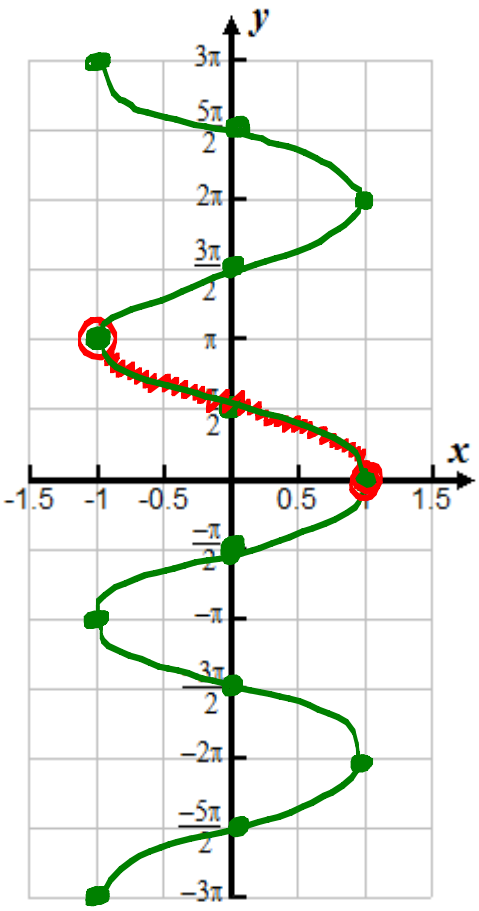
Highlight or emphasize the part of the graph above known as *f(x) = Sin^{-1}(x)*

Consider the graph of the function *f(x) = cos(x)* shown below.



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

Using coordinate points of the graph to assist you and create a sketch of the inverse of f(x) = cos(x).

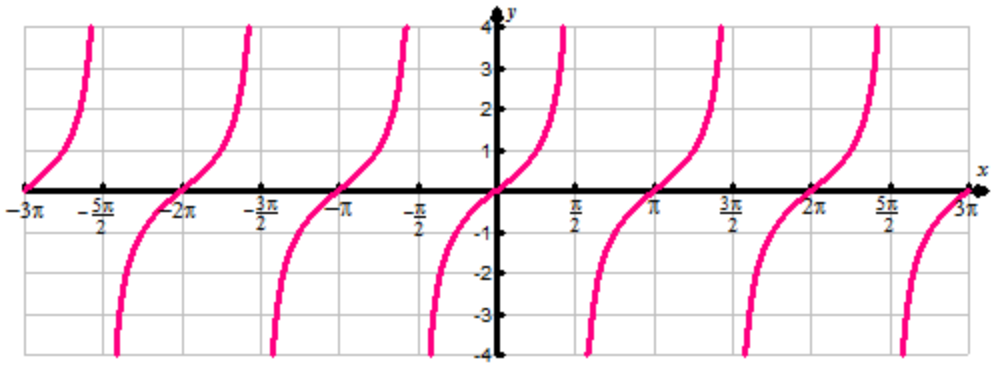


x	y
1	-2π
0	$-3\pi/2$
-1	$-\pi$
0	$-\pi/2$
1	0
0	$\pi/2$
-1	π
0	$3\pi/2$
1	2π

Explain whether or not the complete inverse of *f(x) = cos(x)* is a function. IT IS NOT. THE INVERSE GRAPH ABOVE FAILS THE VERTICAL LINE TEST WHICH SUGGESTS THERE ARE MULTIPLE OUTPUTS FOR A GIVEN INPUT.

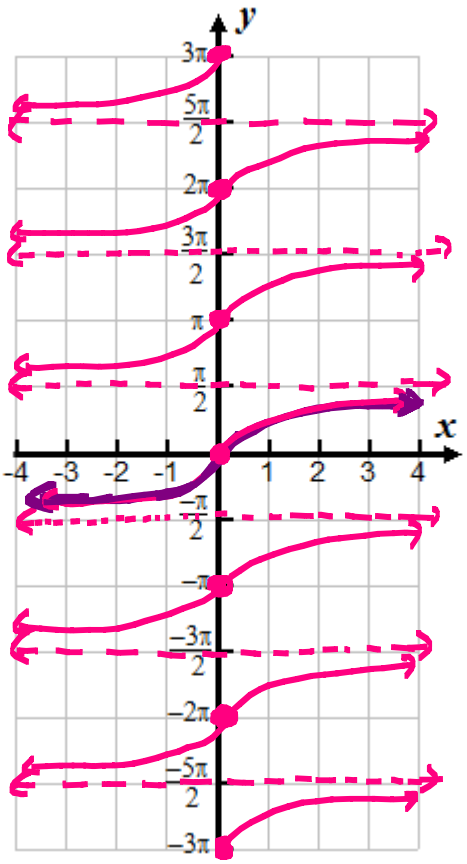
Highlight or emphasize the part of the graph above known as *f(x) = Cos^{-1}(x)*

Consider the graph of the function *f(x) = tan(x)* shown below.



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

Using coordinate points of the graph to assist you and create a sketch of the inverse of *f(x) = tan(x).*



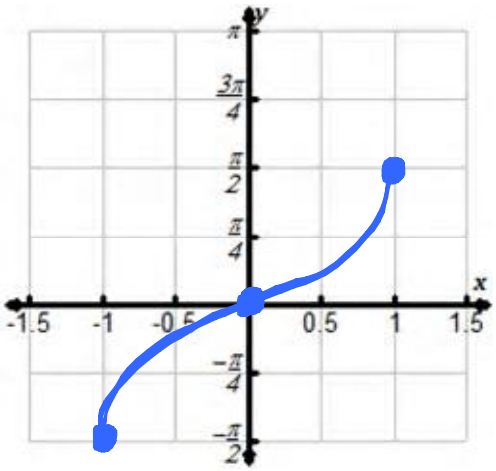
x	y
0	-2π
UND	$-3\pi/2$
0	$-\pi$
UND	$-\pi/2$
0	0
UND	$\pi/2$
0	π
UND	$3\pi/2$
0	2π

Explain whether or not the complete inverse of *f(x) = tan(x)* is a function. IT IS NOT. THE INVERSE GRAPH ABOVE FAILS THE VERTICAL LINE TEST WHICH SUGGESTS THERE ARE MULTIPLE OUTPUTS FOR A GIVEN INPUT.

Highlight or emphasize the part of the graph above known as *f(x) = Tan^{-1}(x)*

Sketch a graph of each of the following and answer the questions

A. Sketch a graph of the function $f(x) = Sin^{-1}(x)$



i) **Minimum**: $-\pi/2$

ii)**Maximum**: $\pi/2$

iii)Describe the **Domain**: $-1 \le x \le 1$ or $[-1, 1]$

iv) Describe the **Range**: $-\frac{\pi}{2} \le y \le \frac{\pi}{2}$ or $[-\frac{\pi}{2}, \frac{\pi}{2}]$

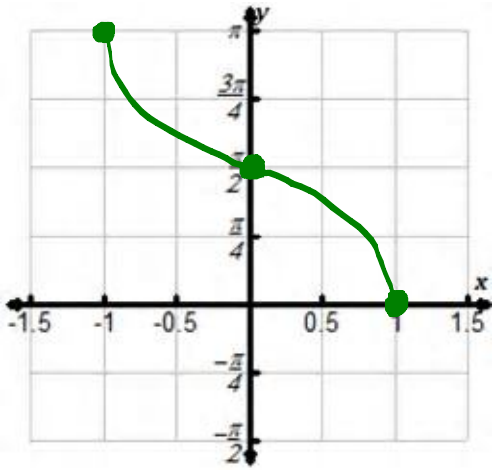
v) Describe **Intervals of Increase**: $[-1, 1]$

vi) Describe **Intervals of Decrease**: NA

vii) Determine the **x-intercept**: $(0, 0)$

viii) Determine the **y-intercept**: $(0, 0)$

B. Sketch a graph of the function $f(x) = Cos^{-1}(x)$



i) Local **Minimums**: 0

ii) Local **Maximums**: π

iii) Describe the **Domain**: $-1 \le x \le 1$ OR $[-1, 1]$

iv) Describe the **Range**: $0 \le y \le \pi$ OR $[0, \pi]$

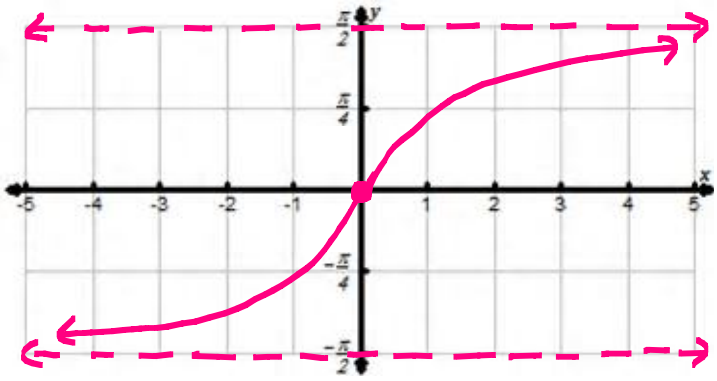
v) Describe **Intervals of Increase**: NA

vi) Describe **Intervals of Decrease**: $[-1, 1]$

vii) Determine the **x-intercept**: $(1, 0)$

viii) Determine the **y-intercept**: $(0, \pi/2)$

C. Sketch a graph of the function $f(x) = Tan^{-1}(x)$



i) **Minimum**: DOES NOT EXIST

ii)**Maximum**: DOES NOT EXIST

iii)Describe the **Domain**: ALL REALS (ℝ) or $(-\infty, \infty)$

iv) Describe the **Range**: $-\frac{\pi}{2} < y < \frac{\pi}{2}$ or $(-\frac{\pi}{2}, \frac{\pi}{2})$

v) Describe **Intervals of Increase**: $(-\infty, \infty)$

vi) Describe **Intervals of Decrease**: NA

vii) As $x \to \infty$, determine **f(x)** $\to$ $\pi/2$

viii) As $x \to -\infty$, determine **f(x)** $\to$ $-\pi/2$

ix) Determine the **x-intercept**: $(0, 0)$

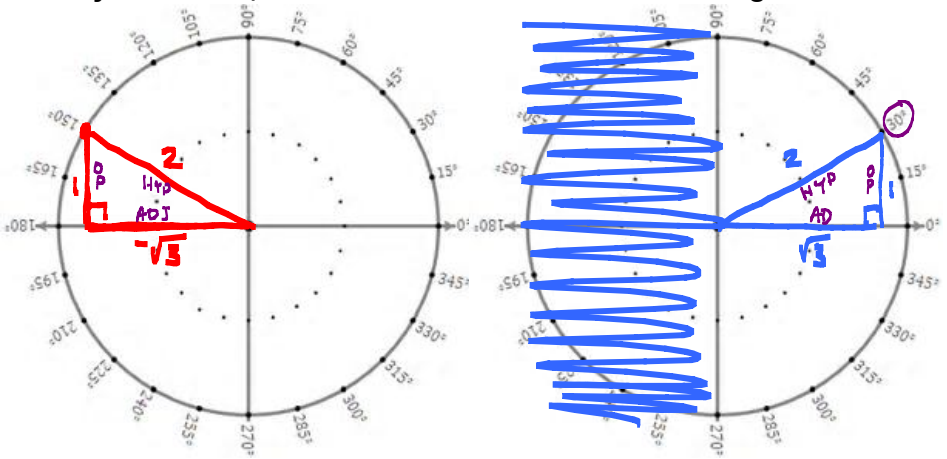
x) Determine the **y-intercept**: $(0, 0)$

Using your knowledge of inverse trigonometry functions, determine the value of the following:

a. $Sin^{-1}(sin(150°))$ =

$Sin^{-1}\left(\frac{1}{2}\right) = 30°$

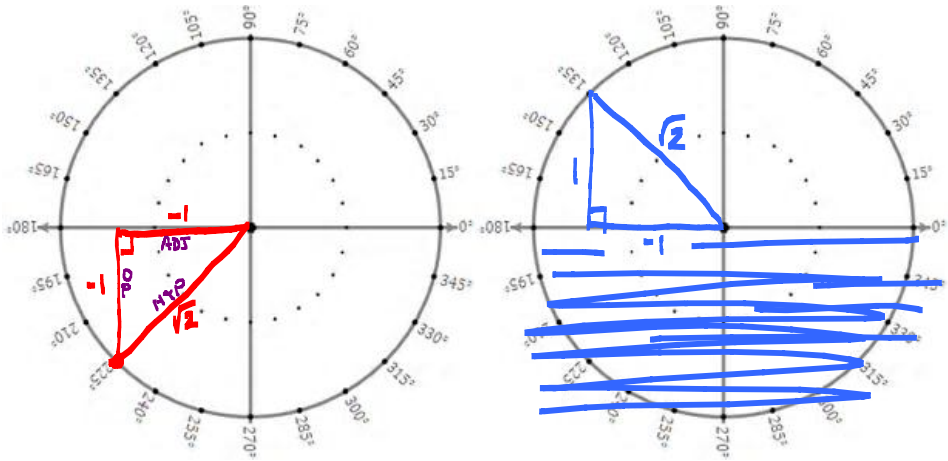
```
sin⁻¹(sin(150))
                30
```



b. $Cos^{-1}(cos(225°))$ =

$Cos^{-1}\left(\frac{-1}{\sqrt{2}}\right) = 135°$

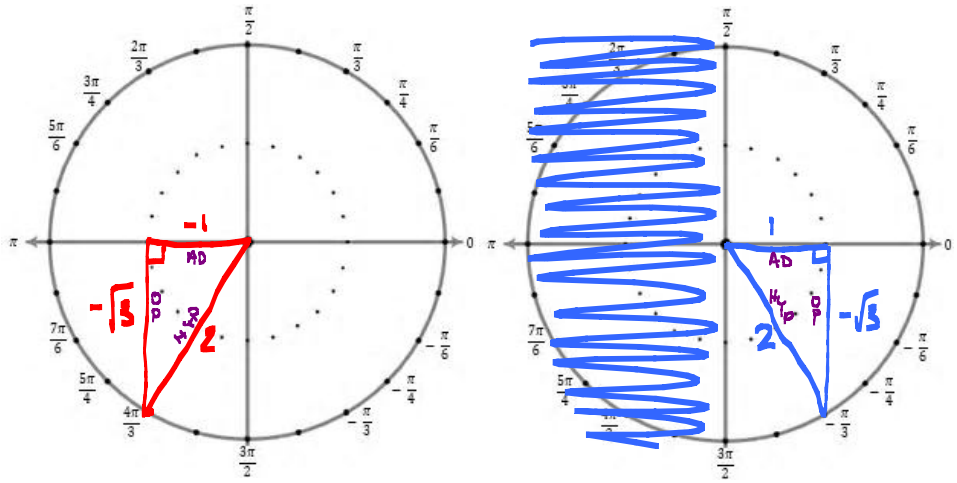
```
cos⁻¹(cos(225))
                135
```



c. $Sin^{-1}\left(sin\left(\frac{4\pi}{3}\right)\right)$ =

$Sin^{-1}\left(\frac{-\sqrt{3}}{2}\right) = -\frac{\pi}{3}$

```
sin⁻¹(sin(4π/3))/
π▸Frac
               -1/3
```



d. $Tan^{-1}\left(tan\left(\frac{5\pi}{6}\right)\right)$ =

$Tan^{-1}\left(\frac{1}{-\sqrt{3}}\right) = -\frac{\pi}{6}$

```
tan⁻¹(tan(5π/6))/
π▸Frac
               -1/6
```