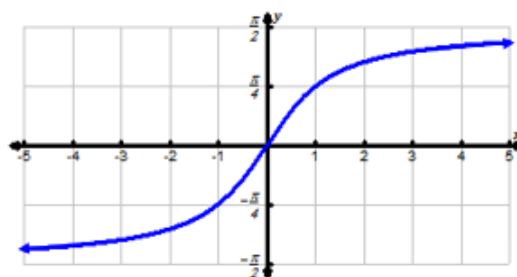
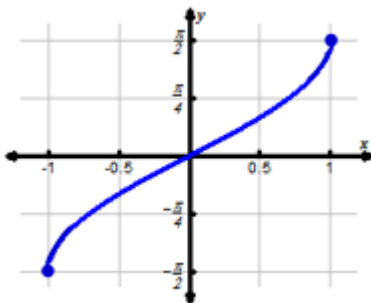
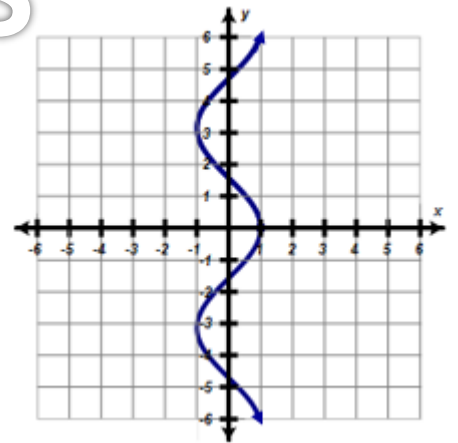
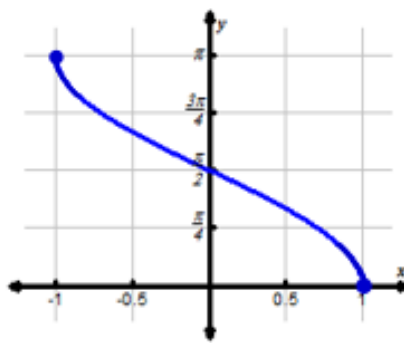
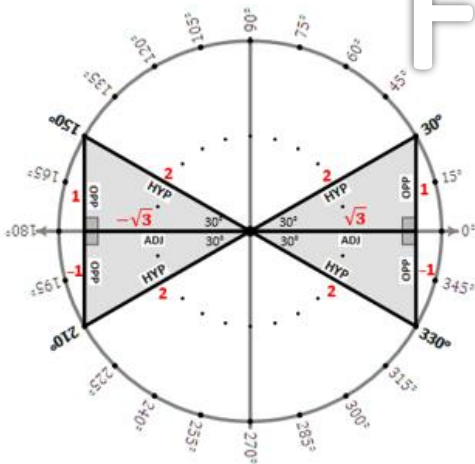


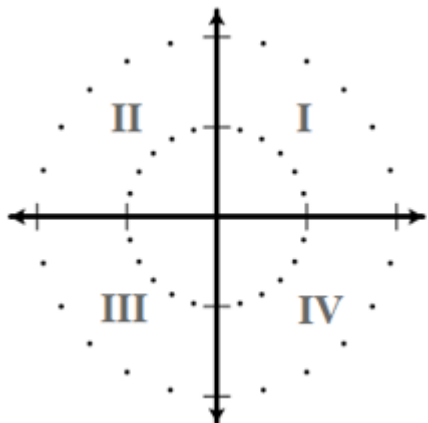
Pre-Calculus

Unit 3: Introduction to Inverse Trigonometric Functions

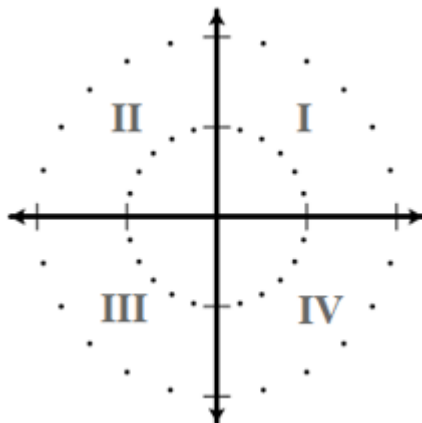


Which 2 quadrants are included in the output (range) of each of the inverse trigonometric functions?

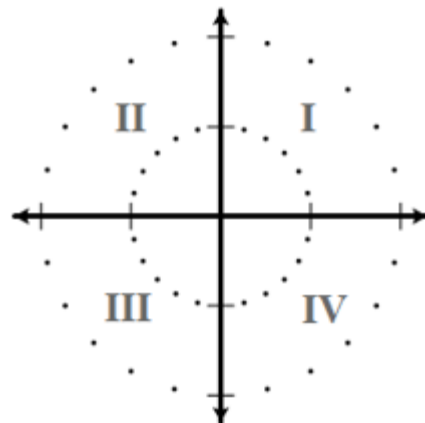
1. $y = \sin^{-1}(x)$



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

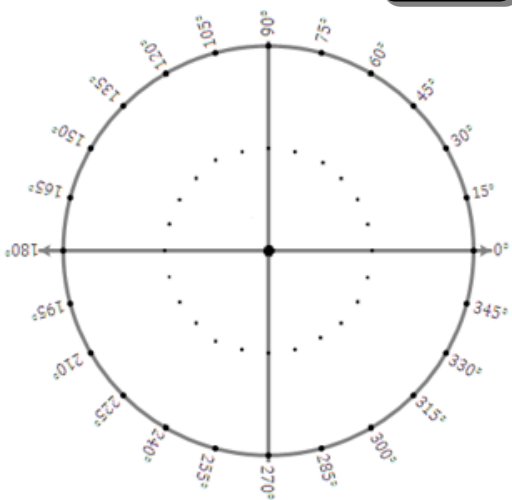


3. $y = \tan^{-1}(x)$

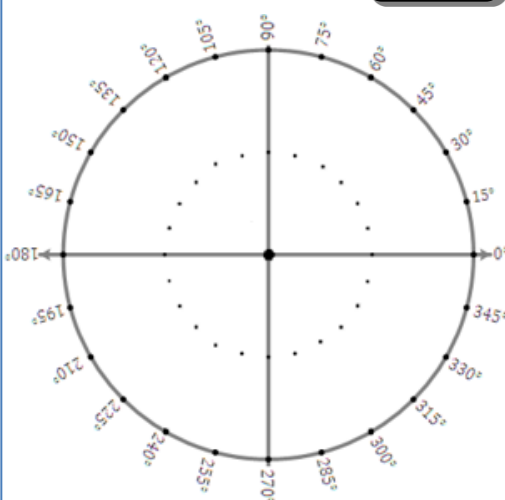


Determine the exact value of each of the following in degrees and draw a representation using the circle.

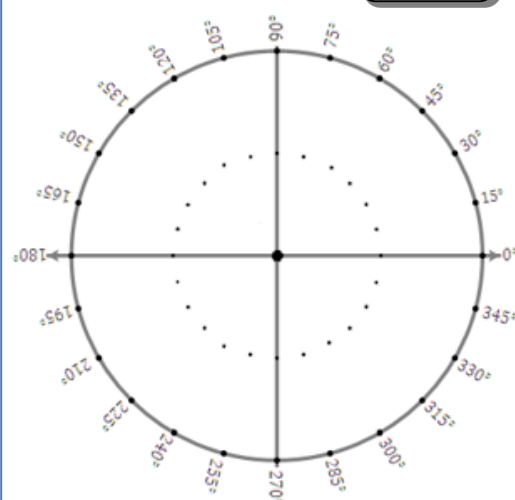
4. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) =$



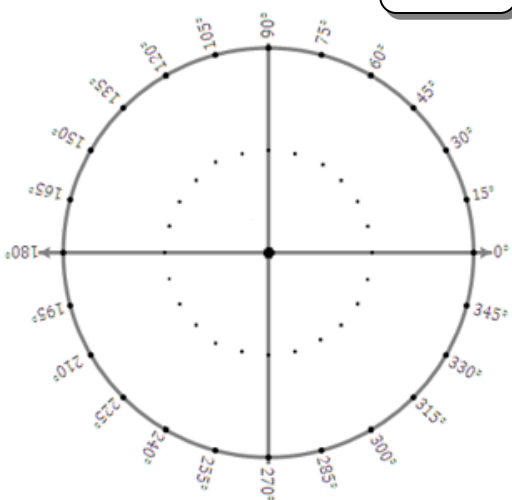
5. $\cos^{-1}\left(-\frac{1}{2}\right) =$



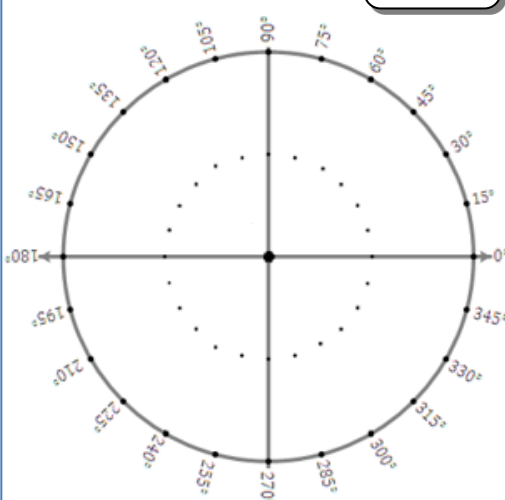
6. $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) =$



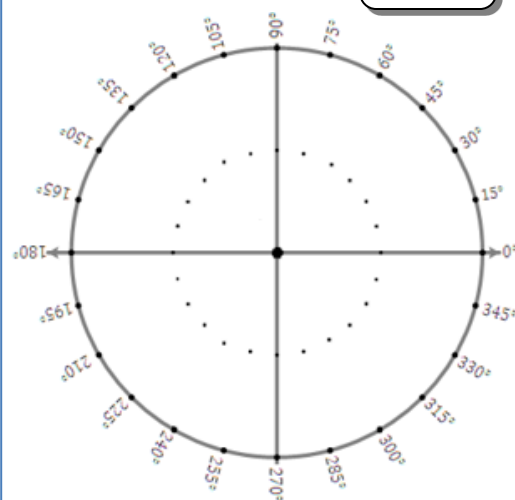
7. $\tan^{-1}\left(-\frac{\sqrt{3}}{1}\right) =$



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

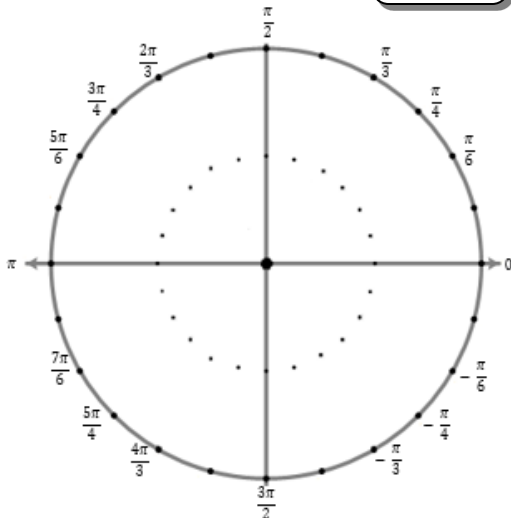


9. $\tan^{-1}(1) =$

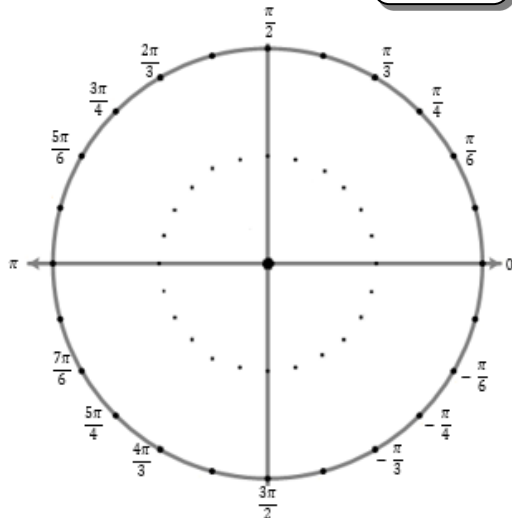


Determine the exact value of each of the following in radians and draw a representation using the circle.

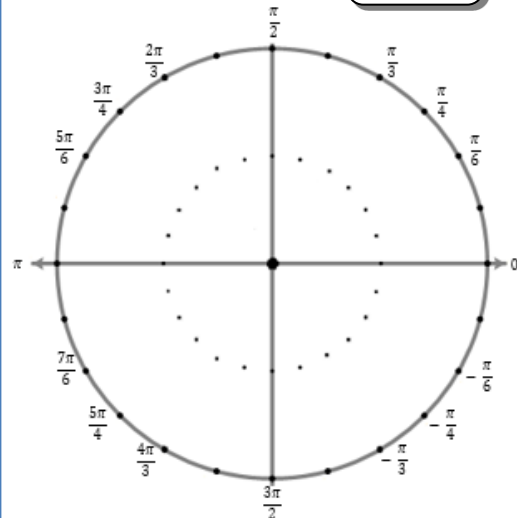
10. $\sin^{-1}\left(\frac{1}{2}\right) =$



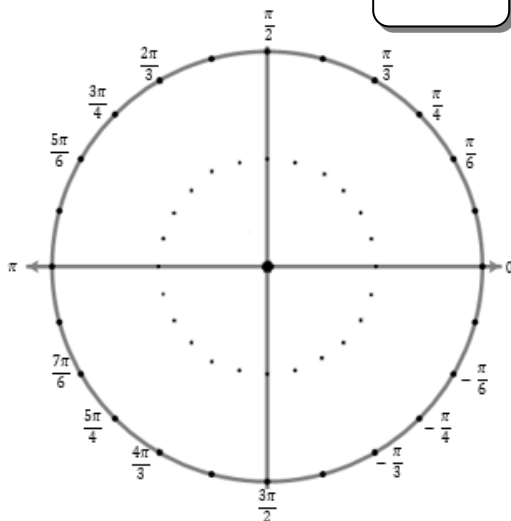
11. $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) =$



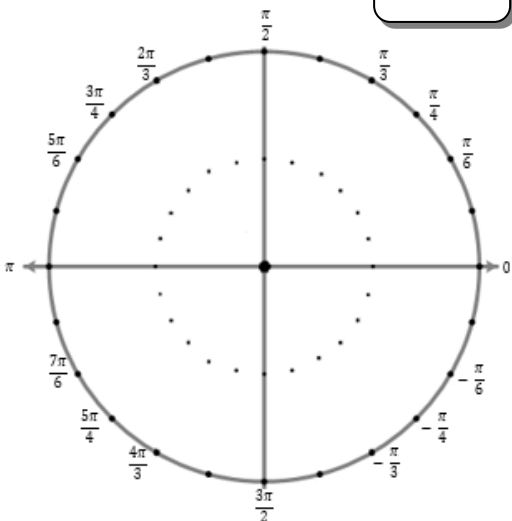
12. $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) =$



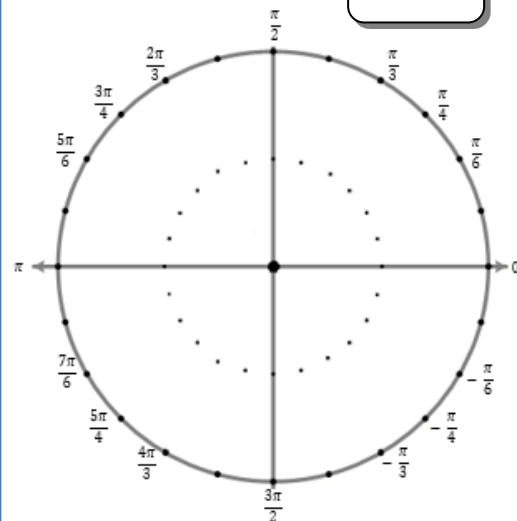
13. $\tan^{-1}\left(\frac{\sqrt{3}}{1}\right) =$



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



15. $\tan^{-1}(-1) =$



Approximate the value of each of the following in radians using your calculator.

11. $\sin^{-1}(0.85) \approx$

11. $\cos^{-1}(\sqrt{0.5}) \approx$

12. $\tan^{-1}(-1.32) \approx$

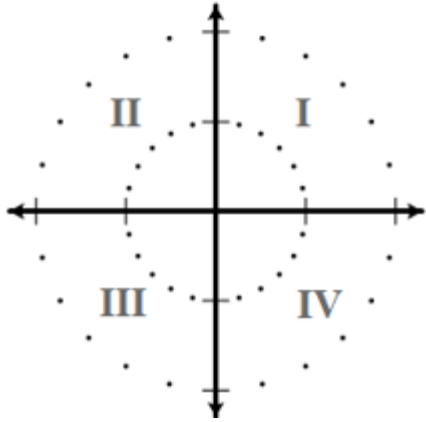
In your own word explain why you think the output (i.e. range) of the inverse trigonometric functions has to be restricted.

Sec 3.2 – Basic Trigonometric Equations
Trigonometric Functions

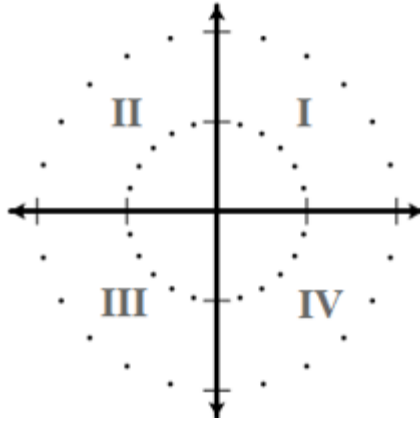
Name: _____

It may help to first review where each of the main trigonometric functions are positive and negative. Indicate the quadrants where each function, is positive and negative.

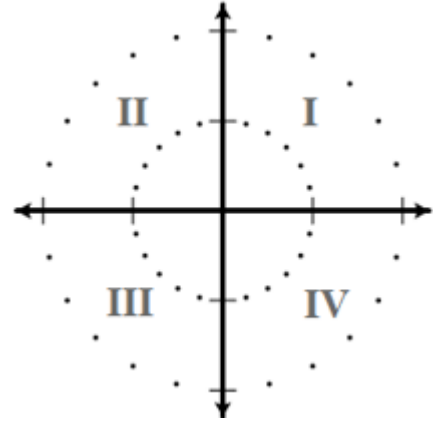
1. $y = \sin(x)$



2. $y = \cos(x)$



3. $y = \tan(x)$

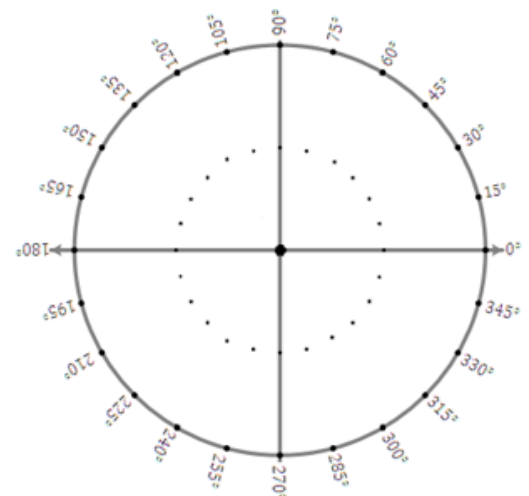
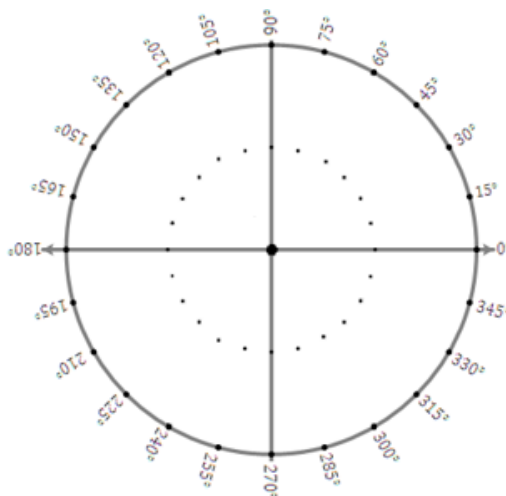
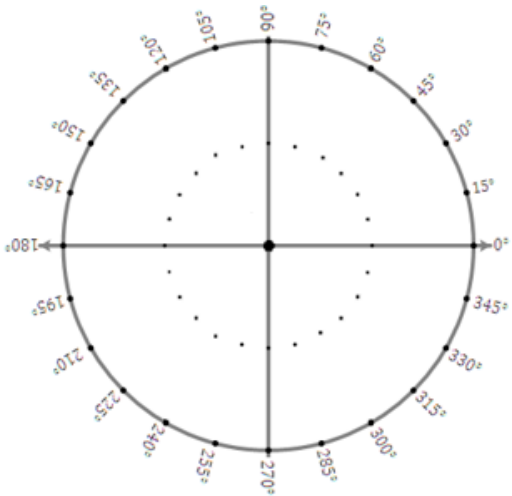


Using special right triangles find all the solutions of θ to the equations in degrees between 0° and 360°

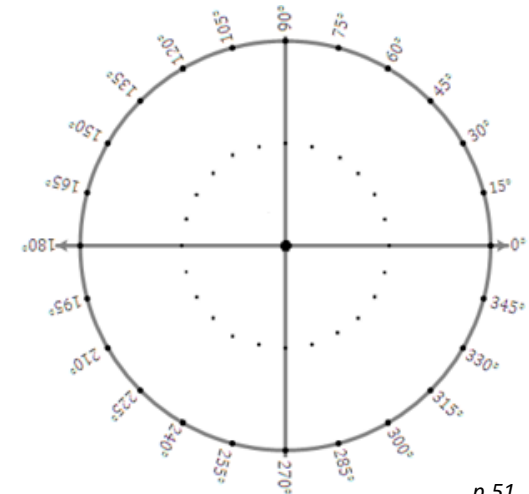
4. $\sin(\theta) = \frac{\sqrt{3}}{2}$

5. $2 \sin(\theta) = -1$

6. $\sqrt{2} \cos(\theta) - 1 = 0$



7. $2 \cos(\theta) + \sqrt{3} = 0$

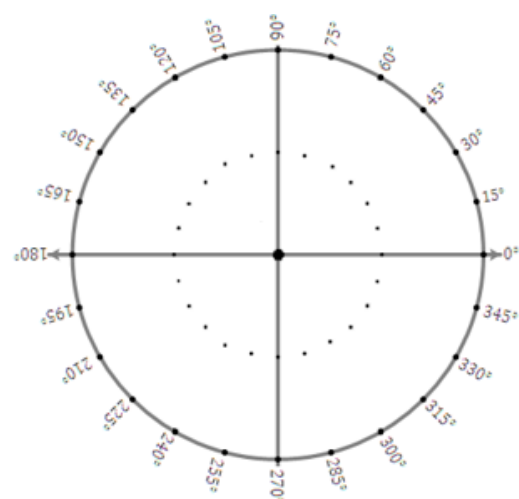
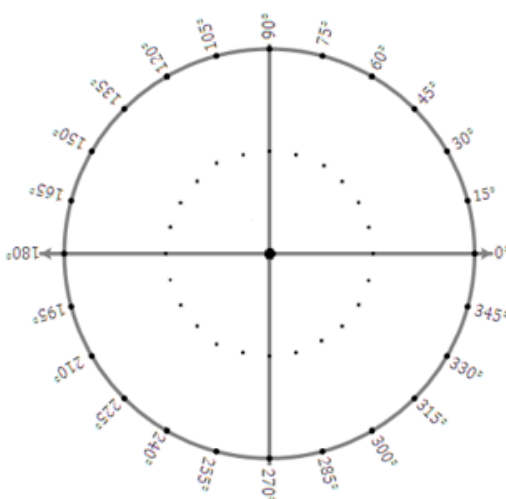
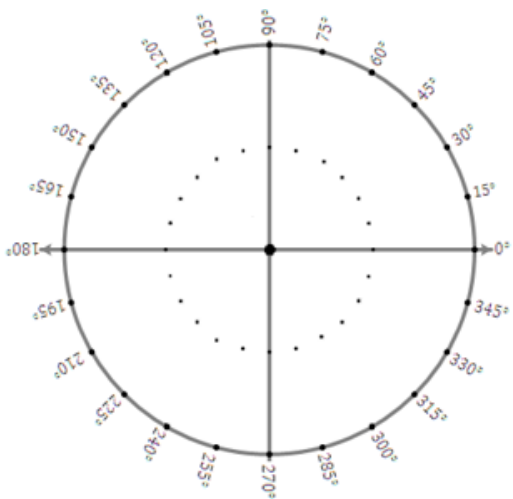


Using the circle find all the solutions of θ to the equations in degrees within the range $0^\circ \leq \theta < 360^\circ$.

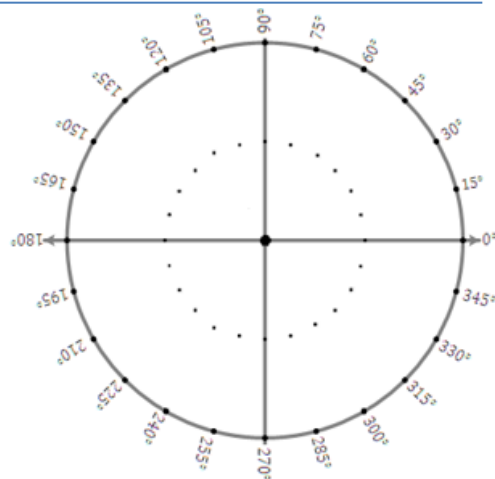
8. $\sqrt{3} \tan(\theta) = -1$

9. $\sin(\theta) = 1$

10. $\cos(\theta) + 1 = 1$



***11. $2\cos(\theta)\sin(\theta) - \sin(\theta) = 0$

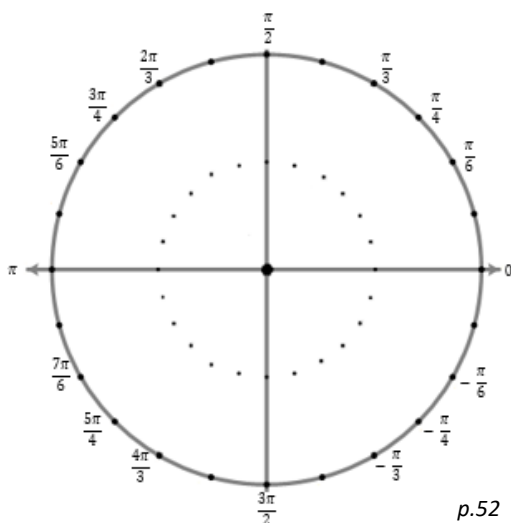
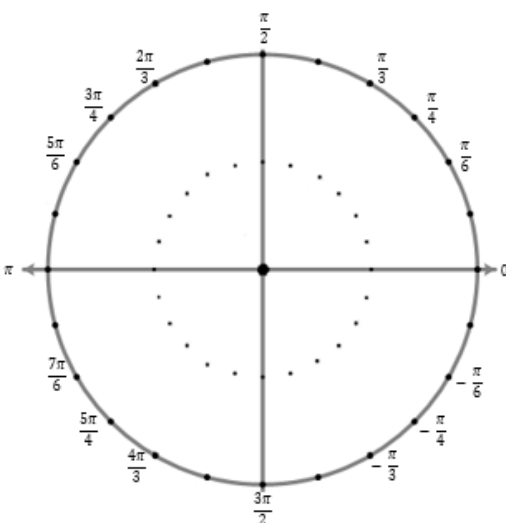
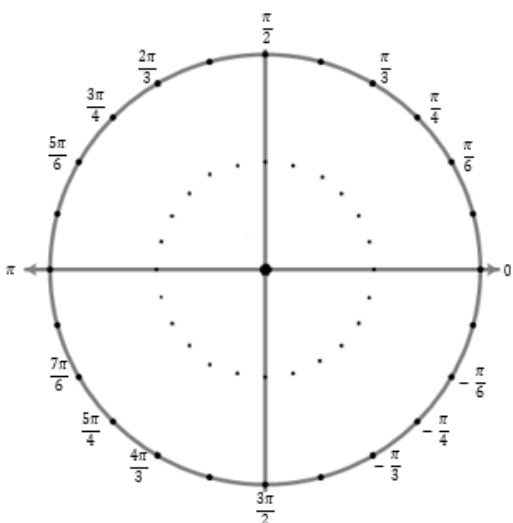


Using the circle find all the solutions of x to the equations in radians within the range $0 \leq x < 2\pi$

12. $\sin(x) = \frac{\sqrt{2}}{2}$

13. $\cos(x) = -\frac{1}{2}$

14. $\tan(x) = 1$

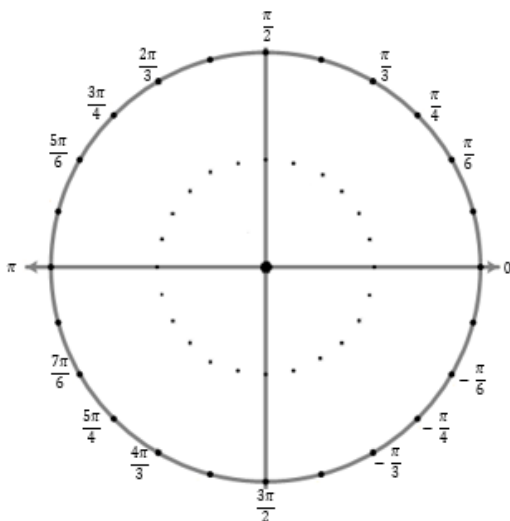
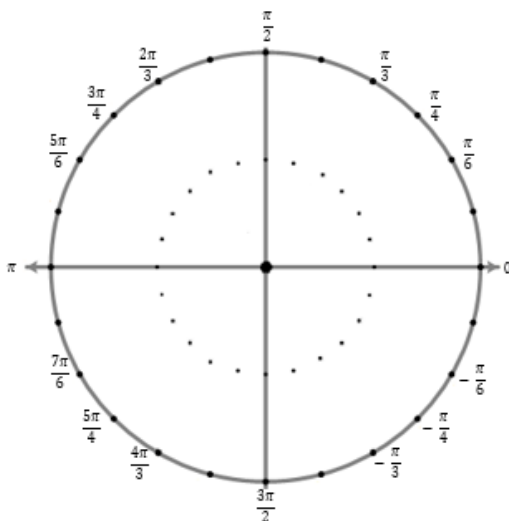
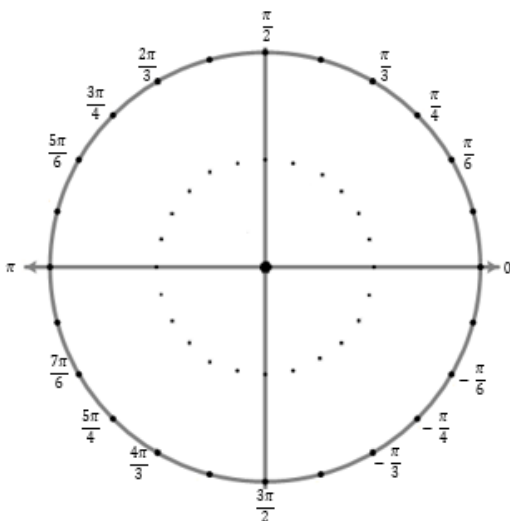


Using the circle find all the solutions of x to the equations in radians within the range $0 \leq x < 2\pi$

15. $2\sin(x) = 1$

16. $\cos(x) = -1$

17. $\tan(x) = \text{undefined}$

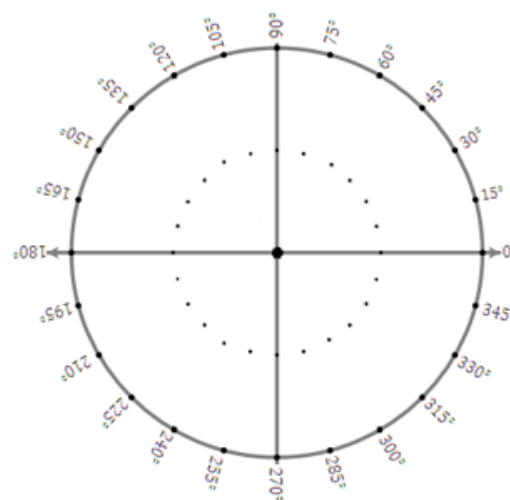
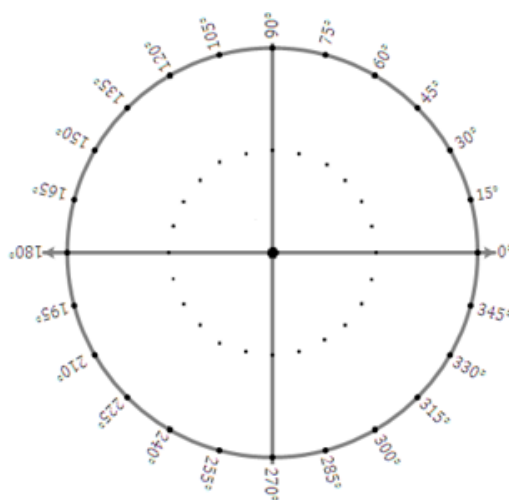
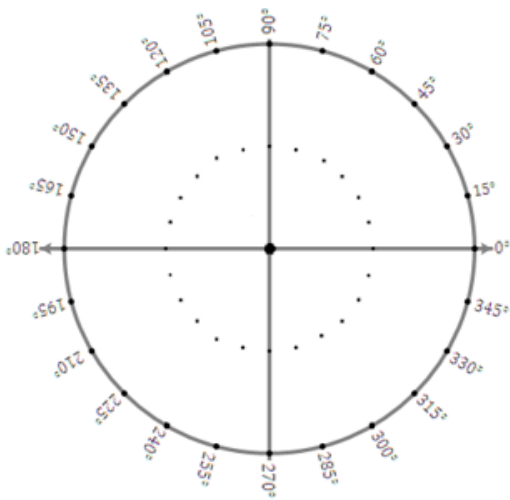


Using the circle find all the solutions of θ to the equations in degrees within the range $0^\circ \leq \theta < 360^\circ$.

18. $\sin(\theta) = 0.78$

19. $\sin(\theta) = -0.41$

20. $\cos(\theta) = 0.32$

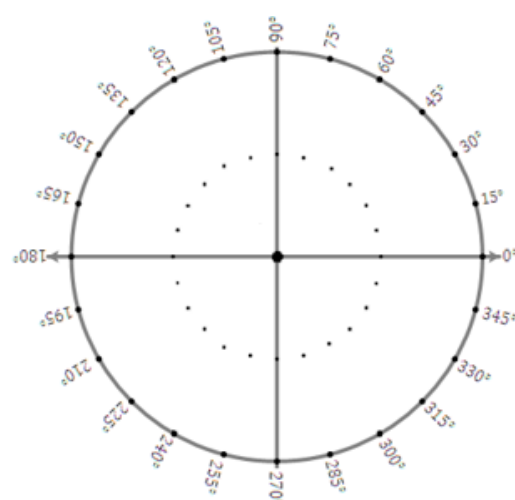
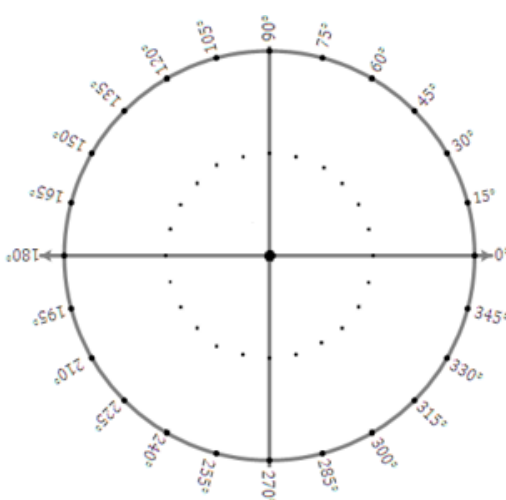
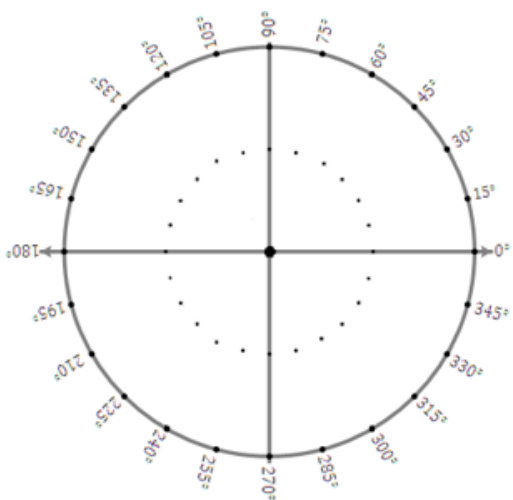


Using the circle find all the solutions of θ to the equations in degrees within the range $0^\circ \leq \theta < 360^\circ$.

21. $\cos(\theta) = -0.24$

22. $\tan(\theta) = 1.41$

23. $\tan(\theta) = -0.87$

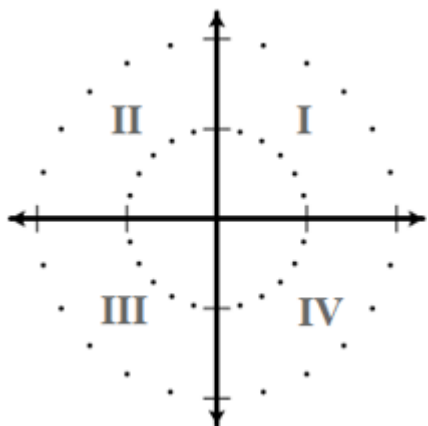


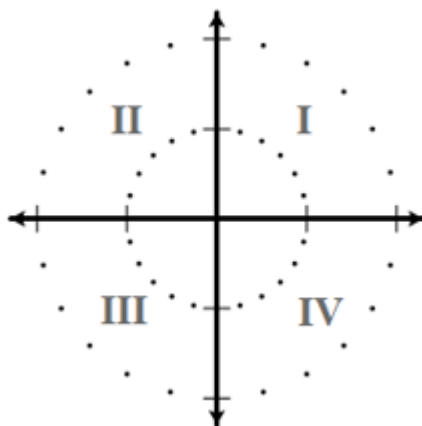
Which quadrant, if any, is described by the given constraints?

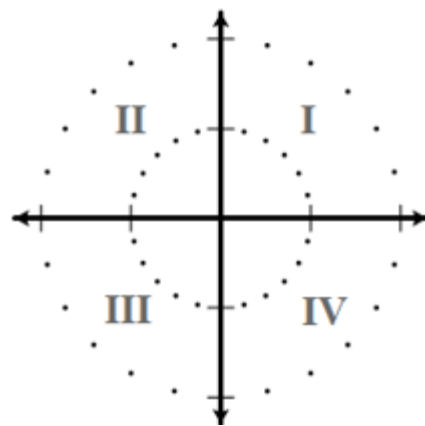
24. $\sin(x) > 0$ and $\cos(x) < 0$

25. $\cos(x) < 0$ and $\tan(x) < 0$

26. $\sin(x) < 0$ and $\cos(x) > 0$



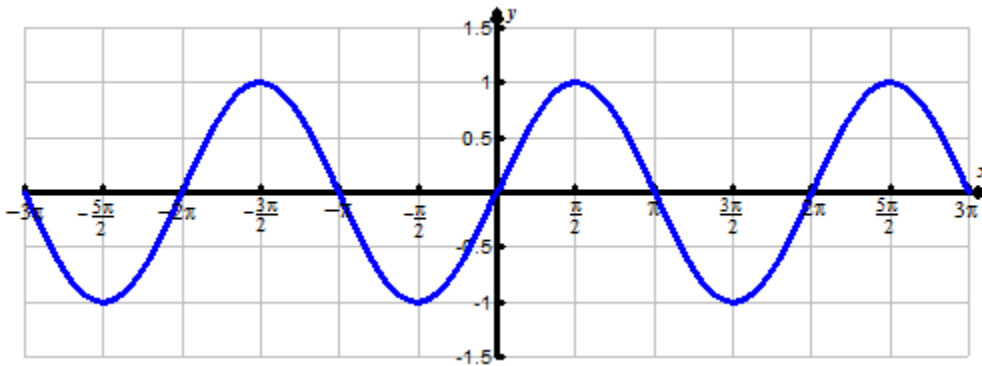




Sec 3.3 – Basic Trigonometric Equations
Inverses of Trigonometric Functions

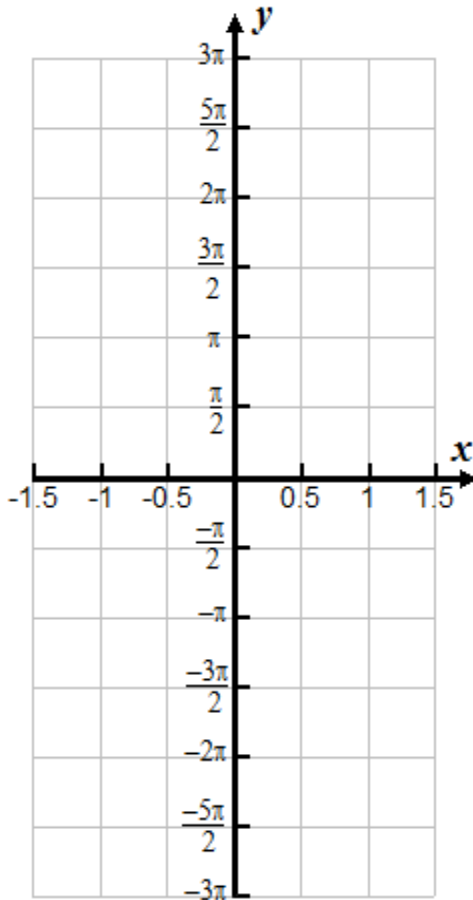
Name: _____

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 $f(x) = \sin(x)$.

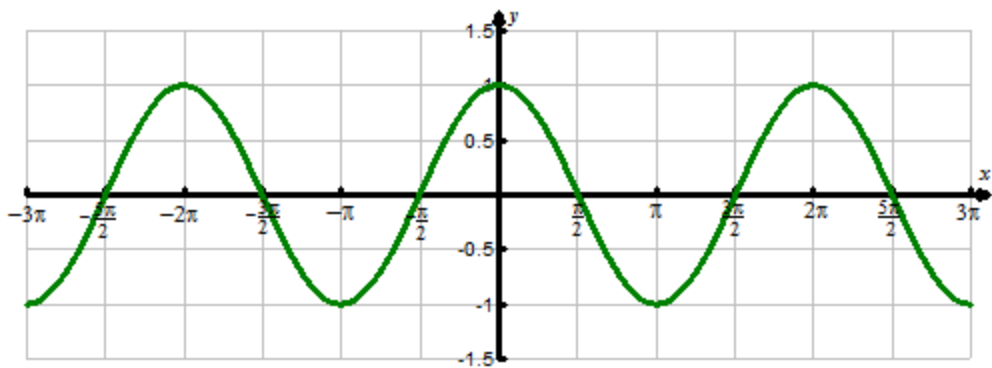


x	y

Explain whether or not the complete inverse of $f(x) = \sin(x)$ is a function. _____

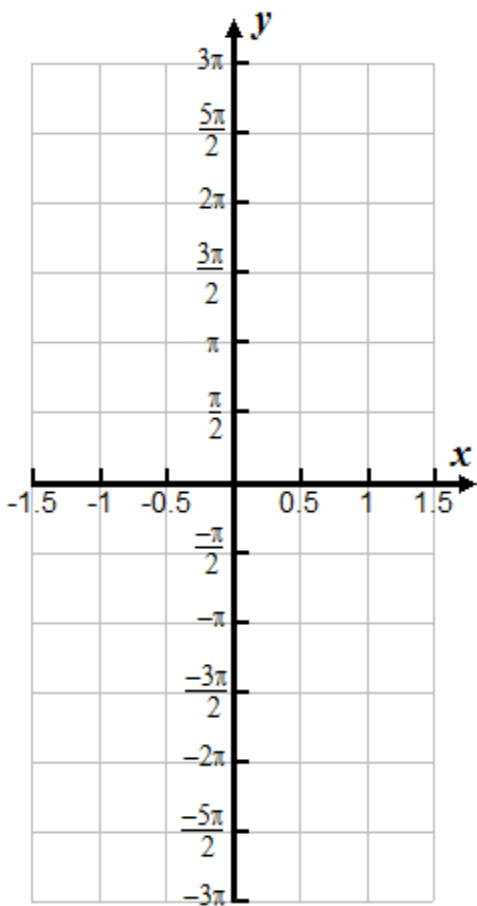
Highlight or emphasize the part of the graph above known as $f(x) = \sin^{-1}(x)$

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 $f(x) = \cos(x)$.

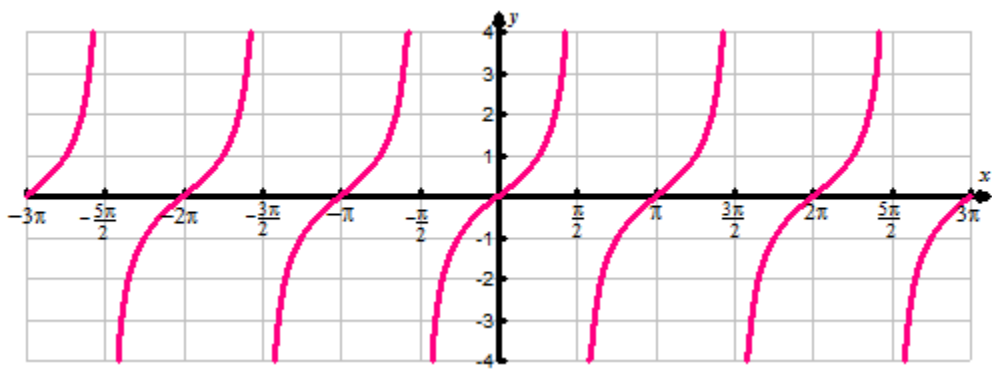


x	y

Explain whether or not the complete inverse of $f(x) = \cos(x)$ is a function. _____

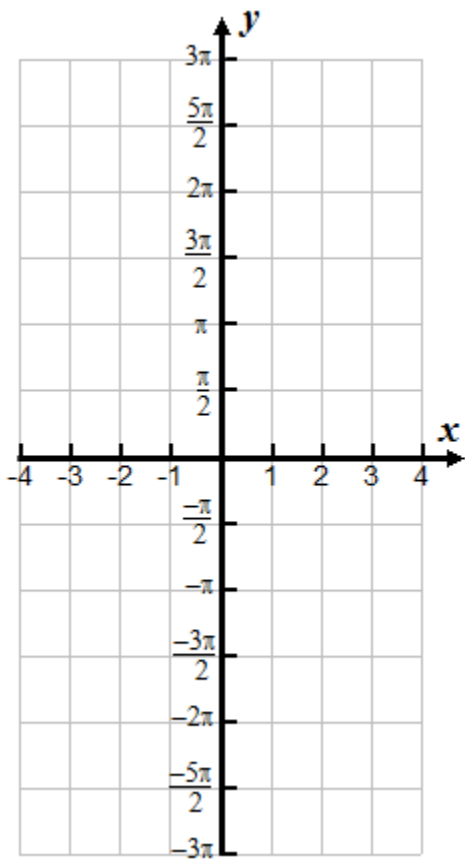
Highlight or emphasize the part of the graph above known as $f(x) = \cos^{-1}(x)$

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 $f(x) = \tan(x)$.



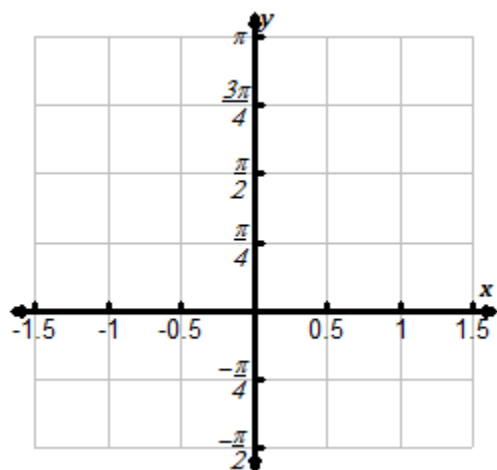
x	y

Explain whether or not the complete inverse of $f(x) = \tan(x)$ is a function. _____

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

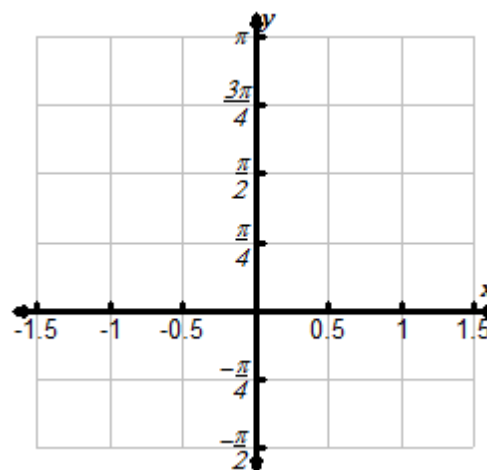
Sketch a graph of each of the following and answer the questions

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



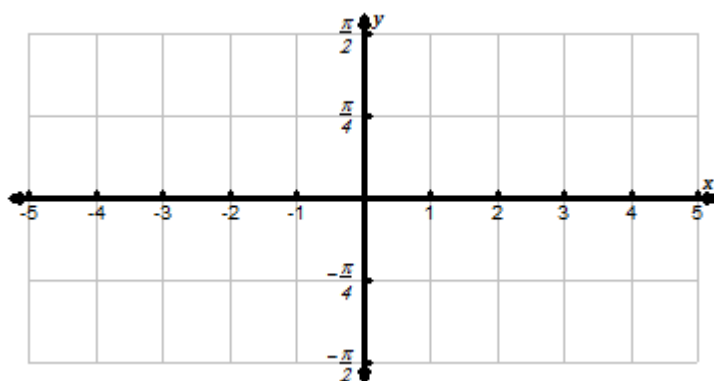
- i) **Minimum:** _____
- ii) **Maximum:** _____
- iii) Describe the **Domain:** _____
- iv) Describe the **Range:** _____
- v) Describe **Intervals of Increase:** _____
- vi) Describe **Intervals of Decrease:** _____
- vii) Determine the **x-intercept:** _____
- viii) Determine the **y-intercept:** _____

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



- i) Local **Minim**ums: _____
- ii) Local **Maxim**ums: _____
- iii) Describe the **Domain:** _____
- iv) Describe the **Range:** _____
- v) Describe **Intervals of Increase:** _____
- vi) Describe **Intervals of Decrease:** _____
- vii) Determine the **x-intercept:** _____
- viii) Determine the **y-intercept:** _____

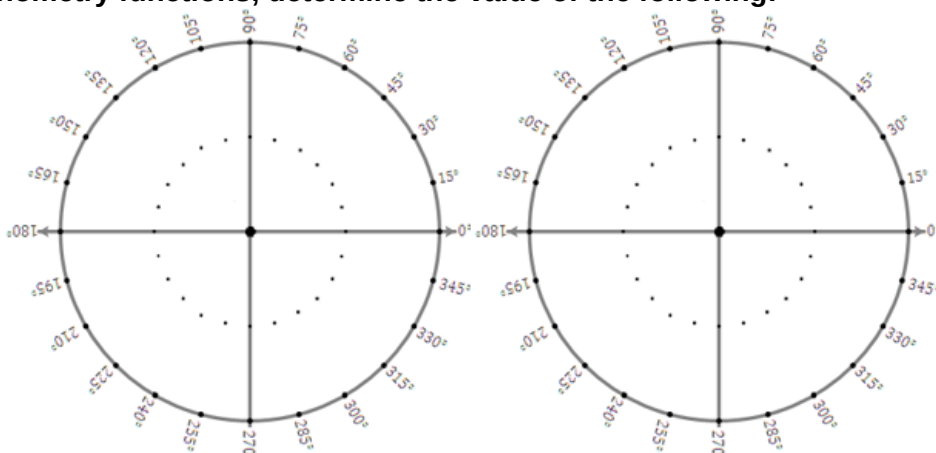
C. Sketch a graph of the function $f(x) = \tan^{-1}(x)$



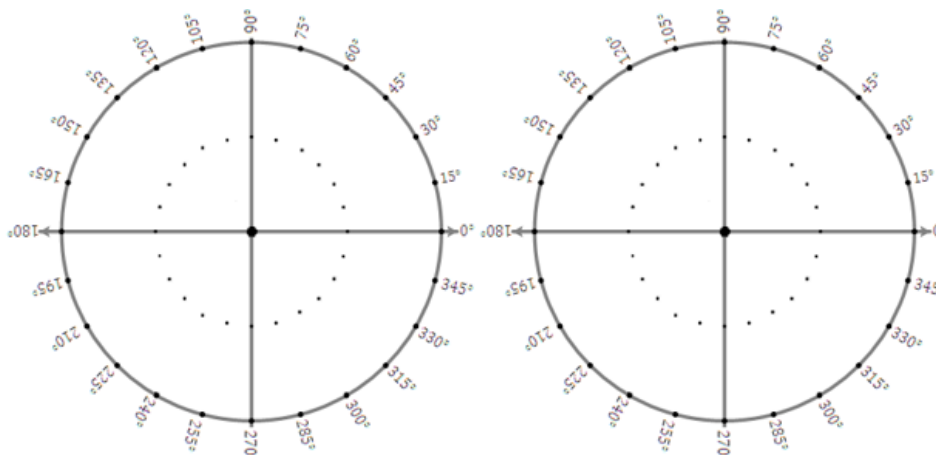
- i) **Minimum:** _____
- ii) **Maximum:** _____
- iii) Describe the **Domain:** _____
- iv) Describe the **Range:** _____
- v) Describe **Intervals of Increase:** _____
- vi) Describe **Intervals of Decrease:** _____
- vii) As $x \rightarrow \infty$, determine $f(x) \rightarrow$ _____
- viii) As $x \rightarrow -\infty$, determine $f(x) \rightarrow$ _____
- ix) Determine the **x-intercept:** _____
- x) Determine the **y-intercept:** _____

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

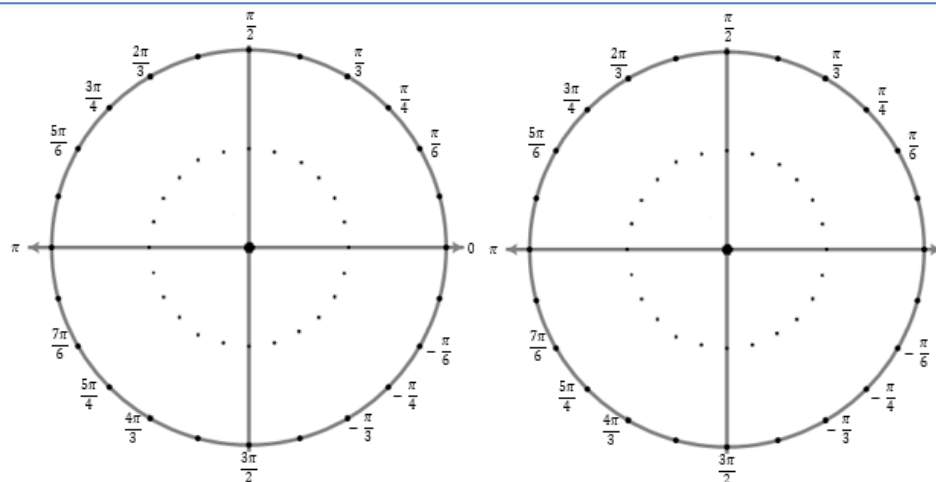
a. $\sin^{-1}(\sin(150^\circ)) =$



b. $\cos^{-1}(\cos(225^\circ)) =$



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



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

