4.3 Principal Inverse Values

Warm-Up Monday

1. Find the inverse values in radians between 0 and 2pi.

$\sin^{-1}\left(-\frac{1}{2}\right)$ $\tan^{-1}\left(-\sqrt{3}\right)$ $\sin^{-1}(-1)$ $\cos^{-1} 0$

S|A
T|C

$\boxed{\frac{7\pi}{6}, \frac{11\pi}{6}}$

$y = -\frac{1}{2}$

S A
T C

$y = -\sqrt{3}$
$x = 1$

$\boxed{\frac{2\pi}{3}, \frac{5\pi}{3}}$

$y = -1$

$\boxed{\frac{3\pi}{2}}$

$x = 0$

$\boxed{\frac{\pi}{2}, \frac{3\pi}{2}}$

2. How many answers does an inverse usually have?

two

About Me:

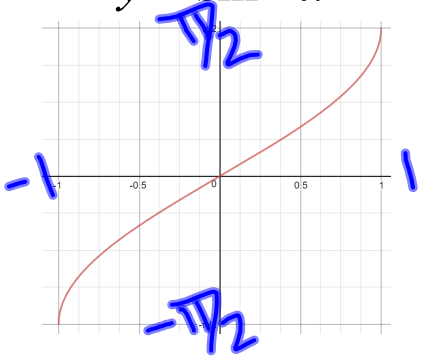
1. Where is the farthest place you've ever traveled to?
2. Where is your favorite place you've ever traveled to?

4.3 Principal Inverse Values

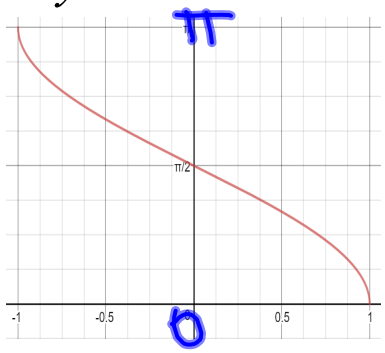
EQ: How do I find the principal inverse value in the restricted range?

ONE ANSWER

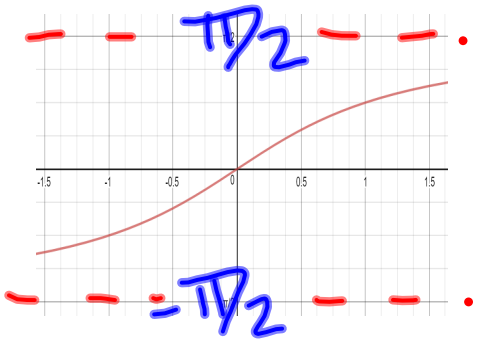
$y = \sin^{-1} x$



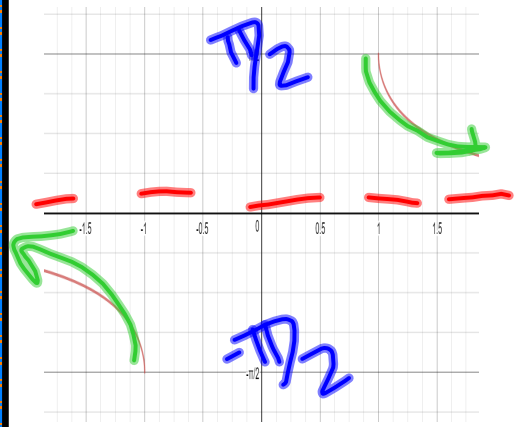
$y = \cos^{-1} x$



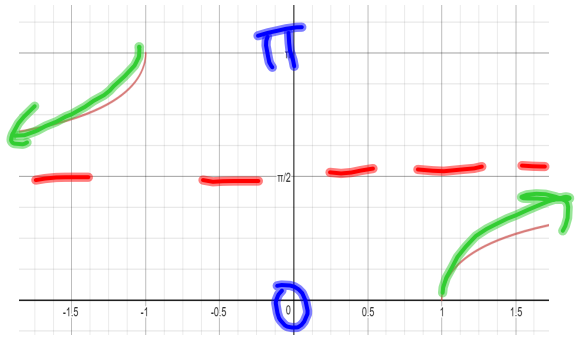
$y = \tan^{-1} x$



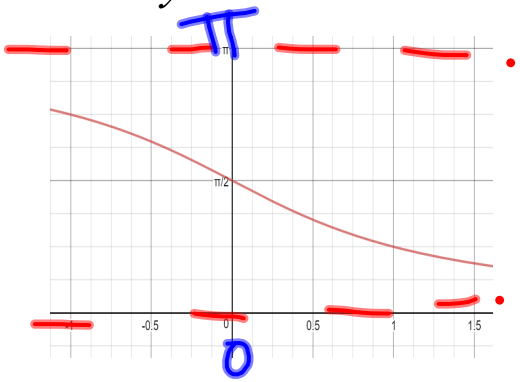
$y = \csc^{-1} x$



$y = \sec^{-1} x$



$y = \cot^{-1} x$

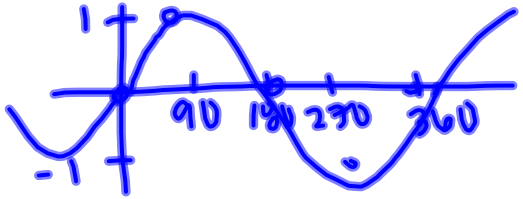


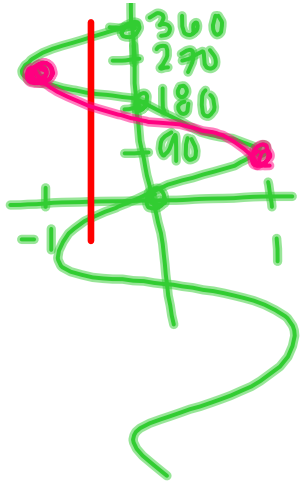
inverse → switch x & y

$y = \sin x$

$x = \sin y$

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



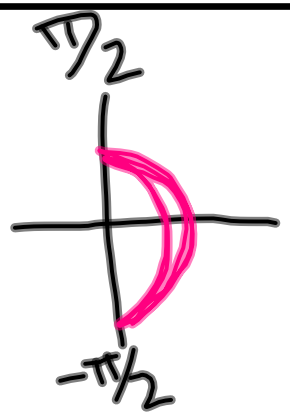


s

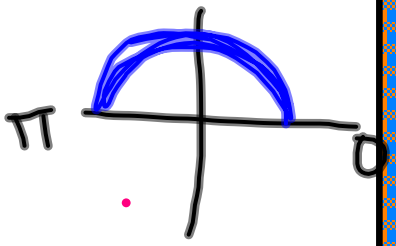
4.3 Principal Inverse Values

EQ: How do I find the principal inverse value in the restricted range?

Restricted Ranges



$-90, 90$ $-\frac{\pi}{2}, \frac{\pi}{2}$	$0, 180$ $0, \pi$
sin	cos
csc	sec
tan	cot

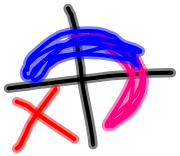


QI +
QII −

QI +
QIV −

find ref ∠, make negative

ONE ANSWER



NOT IN QIII

4.3 Principal Inverse Values

EQ: How do I find the principal inverse value in the restricted range?

Find the principal (ONE) inverse value for each expression.

degrees

1. $\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$ $\boxed{-45°}$

$y = \frac{-1}{\sqrt{2}}$

ref ∠ 45°

radians

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

$x = \sqrt{3}$

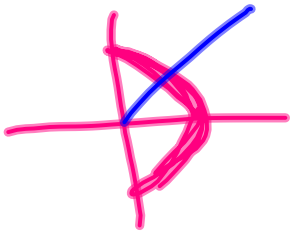
$y = 1$

ref ∠ 30°

$\boxed{\frac{5\pi}{6}}$

radians

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



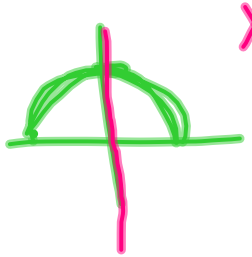
$y = \frac{1}{\sqrt{2}}$

$\boxed{\frac{\pi}{4}}$

degrees

4. $\cos^{-1} 0$

$x = 0$



$\boxed{90°}$

ODDS

4.3 Principal Inverse Values Name:_____

Find the exact principal value in degrees:

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

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

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

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

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

5. $\theta = \arctan(1)$

6. $\theta = \arcsin(1)$

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

8. $\theta = \sin^{-1}(0)$

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

10. $\theta = \arccos\left(\frac{1}{2}\right)$

11. $\theta = \arcsin(-1)$

$-90, 90$

$-\frac{\pi}{2}, \frac{\pi}{2}$

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

$y = -1$

$\boxed{-90^\circ}$

270 ← not in RR

$\frac{3\pi}{2}$

12. $\theta = \cos^{-1}(0)$

Find the exact principle value in radians:

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

14. $x = \arccos\left(-\frac{1}{2}\right)$

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

16. $x = \sec^{-1}\left(-\sqrt{2}\right)$

17. $x = \operatorname{arccsc}(2)$

18. $x = \sec^{-1}\left(\frac{2}{\sqrt{3}}\right)$

19. $x = \sin^{-1}(0)$

20. $x = \arccos\left(-\frac{\sqrt{2}}{2}\right)$

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

22. $x = \sec^{-1}(-1)$

23. $x = \tan^{-1}(0)$

24. $x = \cot^{-1}(-1)$

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

26. $x = \operatorname{arcsec}(-2)$

27. $x = \csc^{-1}(-1)$

28. $x = \cot^{-1}\left(-\sqrt{3}\right)$

29. $x = \sin^{-1}(2)$

30. $x = \operatorname{arcsec}\left(\frac{1}{2}\right)$

4.3 Principal Inverse Values

EQ: How do I find the principal inverse value in the restricted range?

Closing

On google classroom!

4.3 Principal Inverse Values

EQ: How do I find the principal inverse value in the restricted range?

Closing

Find the principal inverse value for each expression.

1. (degrees)

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

2. (radians)

$$x = \sec^{-1}(-1)$$