

(12:50)

Warm-up (Sheet)

(12:58)
Notes

Inverse trig. Functions
look at $y = \sin x$

* Look at notes with inverse trigonometric functions worksheet

Every FUNCTION has an inverse

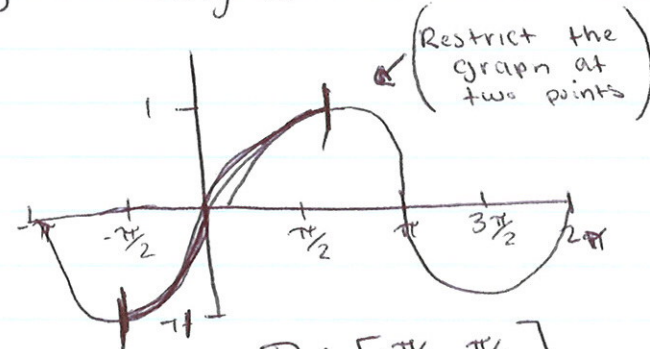
Definition:

$y = \arcsin x$ if and only if $\sin y = x$
 $\sin [y] = [\sin^{-1} x] \sin$
 $y = \sin^{-1} x \rightarrow \sin y = x$

(exchanged
 $x \leftrightarrow y \rightarrow$)

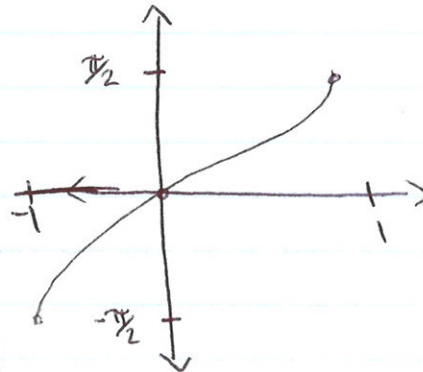
$\sin y = x$ middle

y	$-\pi/2$	0	$\pi/4$	$\pi/2$
x	-1	0	$\frac{\sqrt{2}}{2}$	1



$D: [-\pi/2, \pi/2]$
 $R: [-1, 1]$

(x became y
y became x)



$D: [-1, 1]$
 $R: [-\pi/2, \pi/2]$

Example 1:

$\arcsin(-1)$

$\arcsin(-1) = y$

think: what angle gives me a y of (-1)
 $\rightarrow \sin [\arcsin(-1)] = [\sin y]$ (think of y as θ)

$-1 = \sin y$
 $y = 3\pi/2 = -\pi/2$

Find reference angle then find actual angle

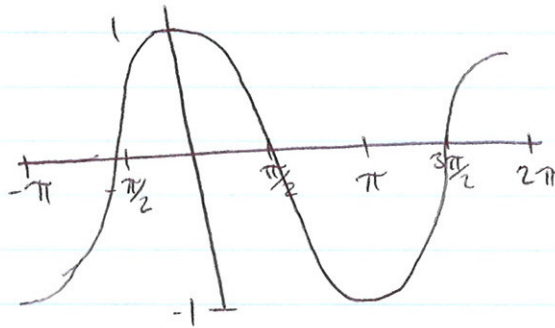


but we going



$-1 = \sin$

Graph $y = \cos x$



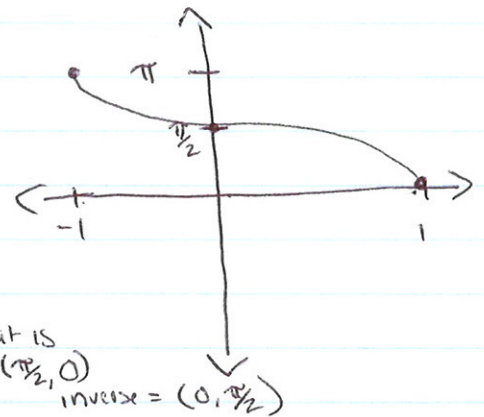
$D: [0, \pi]$
 $R: [-1, 1]$

• What is Domain of inverse funct.?

- It is the range of original funct.

$D: [-1, 1]$
 $R: [0, \pi]$

Cos. functions
 have to be \rightarrow
 between $0 + \pi$



What is cos of 0?

$(0, 1)$

Its inverse is $(1, 0)$

what is
 $(\pi/2, 0)$
 inverse = $(0, \pi/2)$

Example 2: $\arccos \frac{1}{2}$

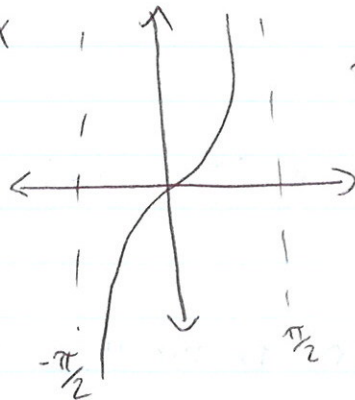
$\arccos \frac{1}{2} = y$

$y = \pi/3$

is $\pi/3$ between $0 + \pi$

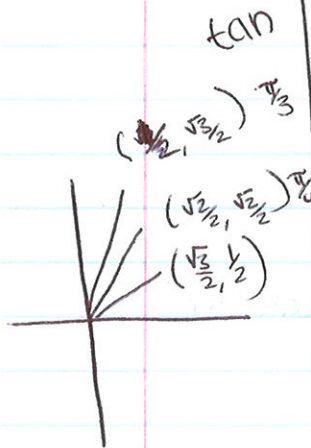
yes \checkmark

$$y = \tan x$$



$$D = (-\pi/2, \pi/2)$$

$$R = (-\infty, \infty)$$



Domain of inverse $D: (-\infty, \infty)$

Range of inverse $R: (-\pi/2, \pi/2)$

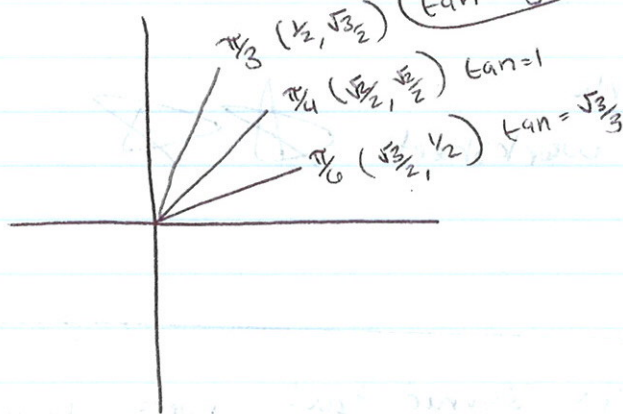
Example 3: Find exact value of $\arctan(\sqrt{3})$

$$\arctan(\sqrt{3}) = y$$

$$y = \sqrt{3}$$

~~tan~~

$$\tan = \sqrt{3}$$



①

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

$$[-\pi/2, \pi/2]$$

$$y = 3\pi/2$$

$$[-90^\circ, 90^\circ]$$

$$y = -\pi/2 \rightarrow 90^\circ$$

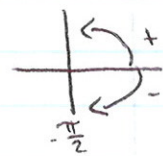
2. $\arctan(-1) = y$

• take coterminal to get inverse

$$7\pi/4 \quad 3\pi/4$$

↓

$$\pi/4 = -45^\circ$$



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

$$y = 0^\circ$$

what ang gives
you -1? →
where is \sin^{-1}

16) $\arccos(1) = 0$

17) $\arccos(-1) = \pi$

18. $\arcsin(-1) = 3\pi/2$ is $3\pi/2$ in range?

no ↓ therefore
 $y = -\pi/2$

* Today's notes on bonmath.com

* HW Packets due tomorrow!

-list homework on cover pg

(7-1) worksheet

(7-2)



• look @ calendar
for help.



Homework

4.7 worksheet



Students learned about inverse trigonometric functions.

Section 4.7 Inverse Trigonometric Functions

Objective: In this lesson you learned how to evaluate the inverse trigonometric functions and how to evaluate the composition of trigonometric functions.

Course Number

Instructor

Date

I. Inverse Sine Function (Pages 309–310)

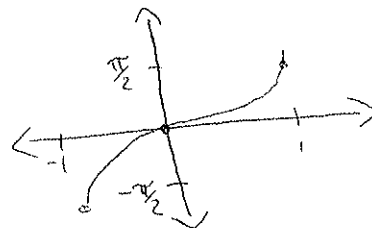
The **inverse sine function** is defined by ...

$$y = \arcsin x \text{ if and only if } \sin y = x$$

The domain of $y = \arcsin x$ is $[-1, 1]$. The range of $y = \arcsin x$ is $[-\frac{\pi}{2}, \frac{\pi}{2}]$.

What you should learn

How to evaluate inverse sine functions



Example 1: Find the exact value: $\arcsin(-1)$.

II. Other Inverse Trigonometric Functions (Pages 311–312)

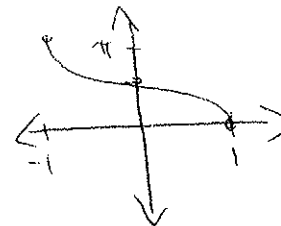
The **inverse cosine function** is defined by ...

$$y = \arccos x \text{ if and only if } \cos y = x$$

The domain of $y = \arccos x$ is $[-1, 1]$. The range of $y = \arccos x$ is $[0, \pi]$.

What you should learn

How to evaluate other inverse trigonometric functions



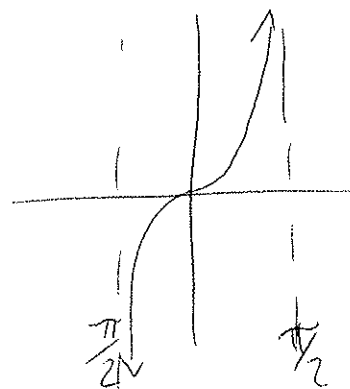
Example 2: Find the exact value: $\arccos \frac{1}{2}$.

The **inverse tangent function** is defined by ...

$$y = \arctan x \text{ if and only if } \tan y = x$$

The domain of $y = \arctan x$ is $(-\infty, \infty)$. The range of $y = \arctan x$ is $(-\frac{\pi}{2}, \frac{\pi}{2})$.

Example 3: Find the exact value: $\arctan(\sqrt{3})$.



Section 4.7 Worksheet
Do on your own paper.

HW

Evaluate each expression in degrees.

- | | | |
|-----------------------------------|--|---------------------------------|
| 1. $\sin^{-1}(-1)$ | 2. $\arctan(-1)$ | 3. $\cos^{-1} 1$ |
| 4. $\arcsin \frac{1}{2}$ | 5. $\arccos\left(-\frac{\sqrt{2}}{2}\right)$ | 6. $\arcsin \frac{\sqrt{3}}{2}$ |
| 7. $\tan^{-1} \frac{\sqrt{3}}{3}$ | 8. $\arcsin(0)$ | 9. $\tan^{-1}(-\sqrt{3})$ |
| 10. $\tan^{-1}(0)$ | 11. $\arccos\left(-\frac{1}{2}\right)$ | 12. $\arccos(0)$ |

Graph and write the domain and range for each graph.

- | | | |
|-----------------------|-----------------------|-----------------------|
| 13. $y = \cos^{-1} x$ | 14. $y = \sin^{-1} x$ | 15. $y = \tan^{-1} x$ |
|-----------------------|-----------------------|-----------------------|

Evaluate in radians.

- | | | |
|------------------------------------|---|---|
| 16. $\arccos 1$ | 17. $\arccos(-1)$ | 18. $\arcsin(-1)$ |
| 19. $\tan^{-1} 1$ | 20. $\tan^{-1}(-\sqrt{3})$ | 21. $\arcsin\left(-\frac{1}{2}\right)$ |
| 22. $\tan^{-1} \frac{\sqrt{3}}{3}$ | 23. $\arcsin\left(\frac{-\sqrt{3}}{2}\right)$ | 24. $\arccos\left(-\frac{1}{2}\right)$ |
| 25. $\tan^{-1} 0$ | 26. $\arccos \frac{\sqrt{3}}{2}$ | 27. $\arcsin\left(-\frac{1}{2}\right)$ |
| 28. $\tan^{-1}(-1)$ | 29. $\arccos 0$ | 30. $\arccos\left(-\frac{\sqrt{3}}{2}\right)$ |
| 31. $\arcsin \frac{\sqrt{2}}{2}$ | | |