

Lesson 21

Read Chapter 18

trigonometric functions

and inverse trigonometric functions

$\sin x$ $\cos x$ $\tan x$ $\cot x$ $\sec x$ $\csc x$

If $\cos x = \frac{1}{2}$ what could $\sin x$ be ? What could x be ?

Solve $\sin x = \cos x$

arcsin x

$\arccos x$

How to solve $\sin x = c$ ($-1 \leq c \leq 1$)

1. $x_1 = \arcsin c$. This is the principal solution. It is an angle $-\frac{\pi}{2} \leq x_1 \leq \frac{\pi}{2}$
2. All values $x_1 + 2\pi k$, $k = 0, 1, 2, \dots, -1, -2, \dots$ are also solutions.
3. $x_2 = \pi - x_1$ is the symmetric solution. It is an angle $\frac{\pi}{2} \leq x_2 \leq \frac{3\pi}{2}$
4. All values $x_2 + 2\pi k$, $k = 0, 1, 2, \dots, -1, -2, \dots$ are also solutions.

How to solve $\cos x = c$ ($-1 \leq c \leq 1$)

1. $x_1 = \arccos c$. This is the principal solution. It is an angle
 $0 \leq x_1 \leq \pi$
2. All values $x_1 + 2\pi k$, $k = 0, 1, 2, \dots, -1, -2, \dots$ are also solutions.
3. $x_2 = -x_1$ is the symmetric solution. It is an angle
 $-\pi \leq x_2 \leq 0$
4. All values $x_2 + 2\pi k$, $k = 0, 1, 2, \dots, -1, -2, \dots$ are also solutions.

arctan x

How to solve $\tan x = c$

1. $x_1 = \arctan c$. It is an angle $-\frac{\pi}{2} \leq x_1 \leq \frac{\pi}{2}$
2. All values $x_1 + \pi k$, $k = 0, 1, 2, \dots, -1, -2, \dots$ are also solutions.

Find your linear velocity v . If your chair breaks at time $t = 5.6$ min and you fall to the ground, traveling along the tangent line with velocity v , when do you hit the ground? ^{and where}