SOLVING EQUATIONS USING GRAPHS

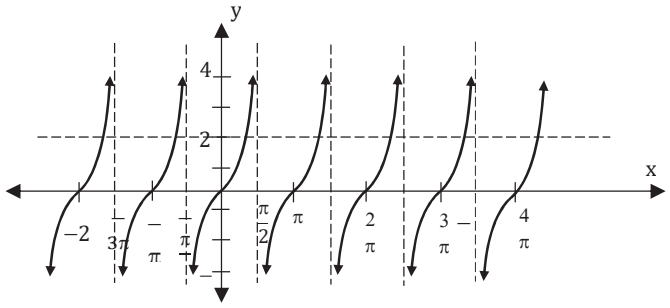
- Solve trigonometric equations both using an intersection and by using the x-intercept.
- Relate this process to using inverse trigonometric functions.
- Language Objectives:
  Describe the difference in process to solve for an intersection point and an x- intercept.

Solving Graphically

Scenario:

We are giving a trigonometric equation. We need to solve for the angle.
How are the answers different from the answers we would get in a regular algebra equation?

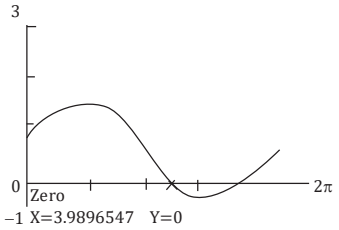
Ex. Solve $\tan x = 2$.

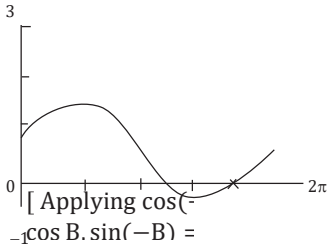


Now, solve it using the x- intercept method: $\tan x - 2 = 0$

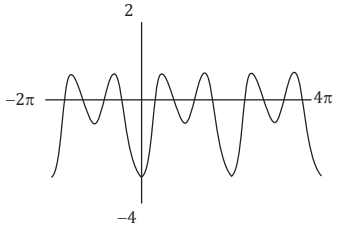
- These are different from solving algebra equation because there are usually infinite answers.
- You need to consider how often this answer will appear and then add that in to your answer.
- You can figure out what to answer if you know the period of that function.

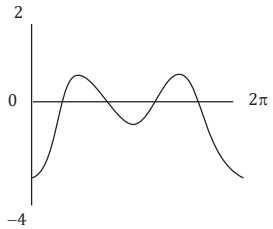
Ex. Solve $\sin y = -0.75$using both the intersection method and the x intercept method.





Ex. Solve $3\sin^2 \Phi - \cos \Phi - 2 = 0$ using the method you like best. What window will help you identify the period?





$$4\sin 2x - 3\cos 2x = 2$$
$$5\sin 3\beta + 6\cos 3\beta = 1$$
$$3\sin^3 2\tau = 2\cos \tau$$
$$2\cos^2 v + \sin v + 1 = 0$$
$$\sec + \tan = 3$$
$$\csc^2 \rho + \sec \rho = 1$$
$$\sin^2 2\delta - 3\cos 2\delta + 2 = 0$$

Solving Using Inverse trigonometric

Solve $\sin x = 0.235$

Solve $\cos \omega = 0.589$

Solve $\tan \alpha = 1.432$

Solve $\csc\theta = 2.331$

So, what is...

$\sin^{-1}(0.334) \approx$

$\tan^{-1}(5.462) \approx$

$\cos^{-1}(0.776) \approx$

Definitions

These are inverse trigonometric functions.

Functions have to pass the vertical line test.

$\arcsin(x) = y| -\frac{\pi}{2}. \leq y \leq \frac{\pi}{2}$

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$\arccos(x) = y \mid 0 \leq y \leq \pi$

$\arctan(x) = y| -\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$

Domain and Range

Determine the domain and range for...

- sin x
- cos x
- tan x
- arcsin x
- arccos X
- arctan x