# Solution of Trigonometric Equations

Sunday, 22 April 2018 7:16 pm

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Solutions of trig equations	6E	1,2,3,4,7,8	

### **RECAP:**

We have been looking at the ideas behind ASTC to help us find solutions to sine, cosine and tangent identities. These values have, on the whole, been between 0° and 360° (or between 0 and  $2\pi$  radians).

E.g. sin 30 °:

This example uses the idea of the two triangles to find answers.



π/2

# The same process can be used to find solutions to Trigonometric Equations



The first value can be found using your CAS calculator and then all other values found using ASTC.

**Example:** Find two values of x for which  $\sin x = -0.3$  with  $0 \le x \le 2\pi$ 

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In all cases it's really important to know how many solutions you are looking to find.



**Example**: We can also be expected to find values in degrees! Find all the values of  $\theta^{\circ}$  between 0 and 360° for which  $\cos \theta = \frac{\sqrt{3}}{2}$ 



#### More complex examples

Whilst they might appear more complex, they aren't!





## Using your CAS calculator

# Great news! Your CAS can solve these for you!!!!

All you need to do is know how to limit the domain.

Solve(sin(2x) = 
$$-\frac{\sqrt{3}}{2}|-\pi \le x \le \pi, x$$
)  
A  
Solve(sin(2x) =  $-\frac{\sqrt{3}}{2}|-\pi \le x \le \pi, x$ )  
Solve( $26$ ) =  $-\frac{\sqrt{3}}{2}$   
Solve( $51n 2x = -\frac{\sqrt{3}}{2}|-\pi \le x \le \pi, x$ )  
Solve( $51n 2x = -\frac{\sqrt{3}}{2}|-\pi \le x \le \pi, x$ )

Placing the vertical line (|) and the domain after the equation and before the comma will tell the CAS to limit the domain and only return solutions between the limits you have given. Otherwise, it will give you a general solution. Much more on general solutions later on!

### ALWAYS MAKE SURE YOUR CALCULATOR IS IN THE CORRECT MODE

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