

§5.3: Solving Trig Functions

“I WILL...

...use standard algebraic techniques to solve and inverses.”

I. Steps

- A. Isolate the trig function. [ex. $2\sin x = 1$]
- B. Make sure to apply the inverse restrictions, if necessary. I
- C. Give all answers [with a $+2\pi n$ or $+\pi n$ on all answers]
- D. $+\pi n$ will come from tan or cot

<p>Ex 1: Find all solutions and solve without a calculator for $\sin x = \frac{\sqrt{2}}{2}$</p>	<p>Ex 2: Find all solutions and solve without a calculator for $\sqrt{3}\csc x - 2 = 0$</p>
<p>Ex 3: Find all solutions and solve without a calculator for $\sin x + \sqrt{2} = -\sin x$</p>	<p>Your Turn: Find all solutions and solve without a calculator for $\cos x - \sqrt{3} = -\cos x$</p>

Ex 4: Find all solutions and solve without a calculator for $3\tan^2 x - 1 = 0$

Ex 5: Find all solutions and solve without a calculator for $\cot x \cos^2 x = 2 \cot x$

Ex 6: Find all solutions and solve without a calculator for $2\cos^2 x = \cos x$

Your Turn: Find all solutions and solve without a calculator for $\sin^2 x = 2 \sin x$

II. *U*-Substitution for Trigonometry

- A. When the base or exponent is bigger than 1 OR there are more than one of the same trig function, an option to use is *u*-substitution.
- B. As a form of substitution, plug the *u* in for the variable with trig functions
- C. Factor the equation with the substitution
- D. Replacing the *u* back to the original trig function and solve

Ex 7: Find all solutions and solve without a calculator for $2\sin^2 x + 3\cos x - 3 = 0$

Ex 8: Find all solutions and solve without a calculator for $\cot^2 x + \csc x - 5 = 0$

Your Turn: Find all solutions and solve without a calculator for $3\sec^2 x - 2\tan^2 x - 4 = 0$

Ex 9: Find all solutions and solve without a calculator for $\sin 2x = -\frac{1}{2}$

Ex 10: Find all solutions and solve without a calculator for $2 \cos 3t - 1 = 0$

Ex 11: Find all solutions and solve without a calculator for $3 \tan \frac{x}{2} + 3 = 0$ from $[0, \pi)$

Your Turn: Find all solutions and solve without a calculator for $\csc 2x - \frac{2}{\sqrt{3}} = 0$