

# Trigonometric Identities – a visual proof – but will it hold up in an algebraic court!

This resource was written by Derek Smith with the support of CASIO New Zealand. It may be freely distributed but remains the intellectual property of the author and CASIO.

Select **GRAPH** icon (press 5), and **TABLE** icon (press 7) from the main menu or by using the arrow keys to highlight and then press **EXE**.

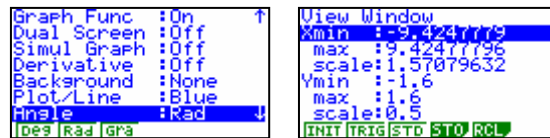


Seeing something visually is very powerful. Using the Graph, Table or Stat icon can assist in confirming trigonometric identities. It is a long way to the rigor of algebraic proof, but the assistance can help students to see the relationships between LHS = RHS proofs that we ask them to prove.

## V-Window set up.

Set for radians.

Change the V-window to TRIG [F2], EXIT and [F6] to DRAW



Set for degrees.

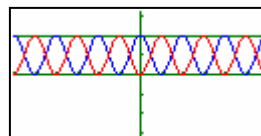
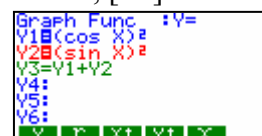
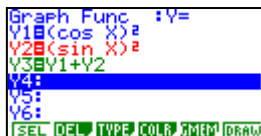
Change the V-window to TRIG [F2], EXIT and [F6] to DRAW



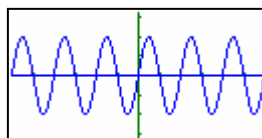
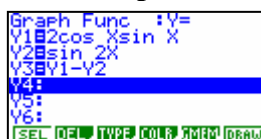
## Example 1: $\cos^2(x) + \sin^2(x) = 1$

Enter  $(\cos x)^2$  in the Y1 space,  $(\sin x)^2$  in the Y2 space and  $Y1+Y2$  in the Y3 space, as illustrated below.

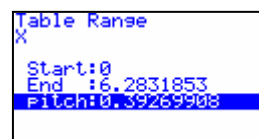
Note: 'Y' is via VARS, [F4] for GRPH, [F1] for Y.



## Example 2: $2\cos(x) \sin(x) = \sin(2x)$



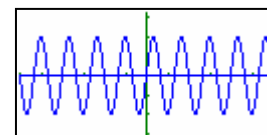
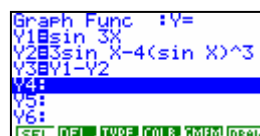
In GRAPH mode.



X	Y1	Y2	Y3
0	0	0	0
0.3926	0.7071	0.7071	-1E-15
0.7853	1	1	0
1.178	0.7071	0.7071	0
1.5708	0	0	0

In TABLE mode.

## Example 3: $\sin 3x = 3\sin x - 4\sin^3 x$



Try:

- $1 + \tan^2\theta = \sec^2\theta$
- $\cot^2\theta + 1 = \operatorname{cosec}^2\theta$
- $\sin(-\theta) = -\sin\theta$
- $\cos(-\theta) = \cos\theta$
- $\tan(-\theta) = -\tan\theta$
- $\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1 = 1 - 2\sin^2\theta$
- What about the sum and product identities too?

For further tips, more helpful information and software support visit our website

[www.monacocorp.co.nz/casio](http://www.monacocorp.co.nz/casio)