

Chapter 6 / **Example 25**

Solving a trigonometric equation

Use your GDC to solve $\sin 3x^\circ + \cos 2x^\circ = 1$ for $0^\circ \leq x \leq 180^\circ$.

Press **MENU** 5 **2nd** **DEL** to display the equation entry screen.

Press **SHIFT** **MENU** (SETUP).

Scroll down using **▼** to Angle and change the setting to **F1** Deg.

Press **EXIT**.

```
Dual Screen :Off
Simul Graph :Off
Derivative  :Off
Background :None
Plot/LineCol:Green
Sketch Line :Norm
Angle       :Deg
Deg Rad Gra
```

Enter $\sin 3x + \cos 2x$ and press **EXE** to enter the first equation as Y1.

Type 1 and press **EXE** to enter the second equation as Y2.

```
Graph Func :Y=
Y1=sin 3x+cos 2x[-]
Y2=1[-]
Y3: [-]
Y4: [-]
Y5: [-]
Y6: [-]
[SELECT][DELETE][TYPE][TOOL][MODIFY][DRAW]
```

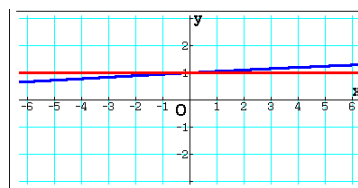
Press **F6** DRAW to display the graph screen.

The GDC now displays the curve and the straight-line:

$Y1 = \sin 3x + \cos 2x$

$Y2 = 1$

The default axes are $-6.3 \leq x \leq 6.3$ and $-3.1 \leq y \leq 3.1$.



To have a better view of the graph, change the window settings.

Press **F3** V-WIN.

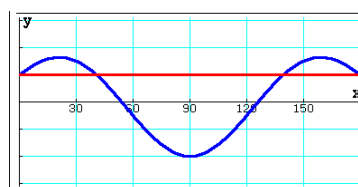
Set the axes so that $0 \leq x \leq 180$ with a scale of 30 and leave everything else the same.

Press **EXIT** when you have finished.

```
View Window
max :180
scale:30
dot :0.47619047
Ymin :-3.1
max :3.1
scale:1
[INITIAL][TRIG][STANDARD][V-WIN][SQUARE]
```

Press **F6** DRAW to display the graph screen.

The GDC displays the graph in a suitable window.

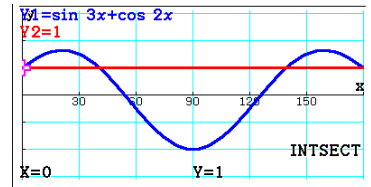


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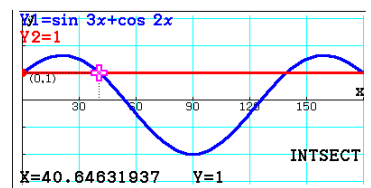
To find the intersections press **F5** G-SOLVE and then press **F5** INTERSECT.

The GDC shows the first intersection.

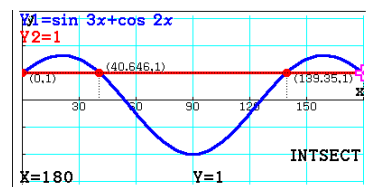


Press **EXE** to display the coordinates.

Press **▶** to move to the next zero and press **EXE** to display its coordinates.



Press **▶** to move to the next zero and press **EXE** to display its coordinates.



Press **EXIT** to leave G-Solv mode and **F6** DRAW to display the graph screen again.

The GDC shows an intersection at $(139.4, 1)$ and also at $(0, 1)$ and $(180, 1)$.

The solutions to the equation are $0^\circ, 40.6^\circ, 139.4^\circ$ and 180° .

