

Chapter 6 / **Example 25**

# Solving a trigonometric equation

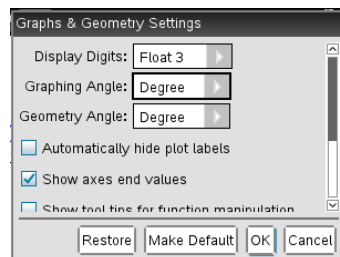
Use your GDC to solve  $\sin 3x^\circ + \cos 2x^\circ = 1$  for  $0^\circ \leq x \leq 180^\circ$ .

Open a new document and add a Graphs page.

Press **menu** 9:Settings.

Change Graphing Angle to Degree.

Press **enter**.

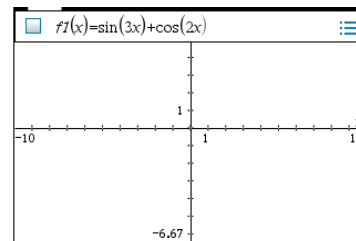


The entry line is displayed at the top of the work area.

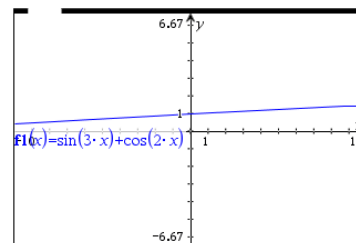
The default graph type is function, so 'f1(x)= ' is displayed.

The default axes are  $-10 \leq x \leq 10$  and  $-6.67 \leq y \leq 6.67$ .

Type  $\sin(3x) + \cos(2x)$  and press **enter**.

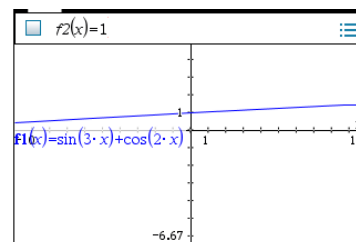


The GDC displays the graph  $f1(x) = \sin(3x) + \cos(2x)$  with the default axes.



Press **tab** to display the entry line again. This time 'f2(x)= ' is displayed.

Type 1 and press **enter**.

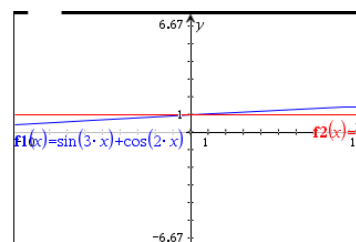


The GDC now displays both graphs:

$$f1(x) = \sin(3x) + \cos(2x)$$

$$f2(x) = 1$$

with the default axes.



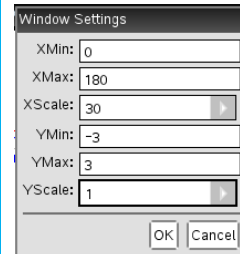
Chapter 6 / **Example 25**

# Solving a trigonometric equation

Press **menu** 4:Window/Zoom | 1:Window Settings...

Set the axes to show  $0 \leq x \leq 180$  with a scale of 30 and  $-3 \leq y \leq 3$  with a scale of 1.

Press **enter** when you have finished.

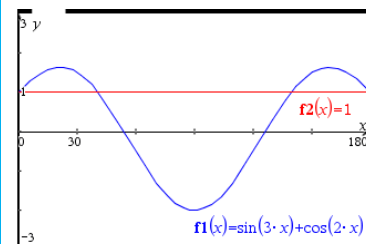


The GDC now displays both graphs:

$$f1(x) = \sin(3x) + \cos(2x)$$

$$f2(x) = 1$$

in a suitable window.

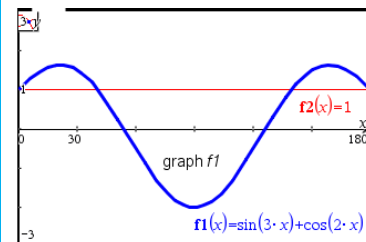


There are two ways to find intersection points. The first is to use **menu** 6:Analyse Graph | 4:Intersection. When there is more than one point, however, the following method is quicker.

Press **menu** 8:Geometry | 1:Points & Lines | 3: Intersection Point(s)

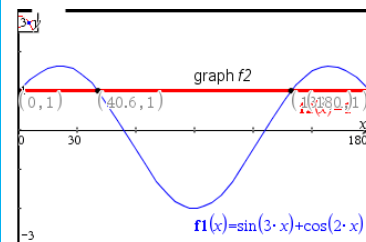
To find the points use the touchpad to highlight the quadratic curve. You will see 'graph f1' displayed.

Click the touchpad.



Use the touchpad to highlight the straight line. You will see 'graph f2' displayed.

Click the touchpad.



The GDC now displays the coordinates of both points of intersection.

The points of intersection are  $(0, 1)$ ,  $(40.6, 1)$ ,  $(139.4, 1)$  and  $(180, 1)$ .

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

