Chapter 6 / **Example 41**

Drawing the tangent and normal

Given the function $y = 3\cos\left(x - \frac{\pi}{3}\right) - 1, -\infty < x < \infty$

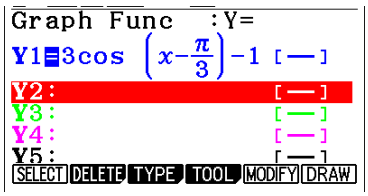
at the point P where the graph intersects the *y*-axis.

a Find the equation of the tangent. **b** Find the equation of the normal.

c Verify using your calculator.

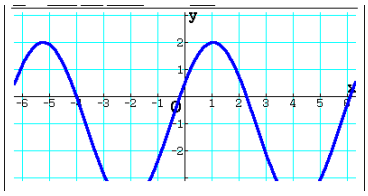
Press MENU 5 GRAPH to display the equation entry screen.

Type $3\cos\left(x - \frac{\pi}{3}\right) - 1$ and press EXE to enter the equation as Y1.



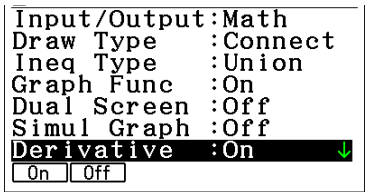
Press F6 DRAW to display $Y1 = 3\cos\left(x - \frac{\pi}{3}\right) - 1$ on the graph screen.

The default axes are $-6.3 \le x \le 6.3$ and $-3.1 \le y \le 3.1$. These axes have the same scales. This will make the tangent and normal appear to be perpendicular.



Press EXIT then press SHIFT MENU SET UP.

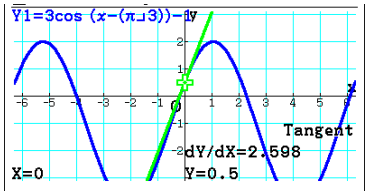
Scroll down to Derivative with ▼ and use F1 to set this to 'On'. Press EXIT to return to the equation entry screen and F6 DRAW to return to the graph.



To draw the tangent at $x = 0$ press F4 Sketch and F2 Tangent.

Type 0 the value of the *x*-coordinate and press EXE.

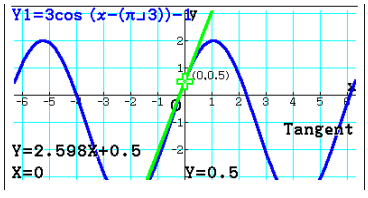
The GDC displays the function and the gradient and tangent at $x = 0$.



Press EXE again.

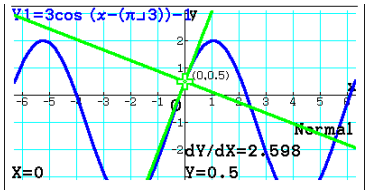
The GDC displays the function and the equation of the tangent at $x = 0$.

The equation of the tangent is $y = 2.60x + 0.5$.



Chapter 6 / **Example 41**

Drawing the tangent and normal

To draw the normal at $x = 0$ press [F4] Sketch and [F3] Norm. Type 0 the value of the x-coordinate and press [EXE]. The GDC displays the function, the tangent and the normal at $x = 0$.	
Press [EXE] again. The GDC displays the equation of the normal at the point $x = 0$. The equation of the normal is $y = -0.384x + 0.5$.