

Chapter 6 / Example 39

Gradient of a trigonometric function

Find the gradient of the curve $y = 3x \cos(2x)$ at the point $\left(\frac{5\pi}{6}, \frac{5\pi}{4}\right)$.

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

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.

```
Input/Output: Math
Draw Type    : Connect
Ineq Type    : Union
Graph Func   : On
Dual Screen  : Off
Simul Graph  : Off
Derivative   : On
On Off
```

Type $3x \cos 2x$ and press **EXE** to enter the equation as Y1.

```
Graph Func : Y=
Y1=3xcos 2x [—]
Y2: [—]
Y3: [—]
Y4: [—]
Y5: [—]
Y6: [—]
[SELECT] [DELETE] [TYPE] [TOOL] [MODIFY] [DRAW]
```

Press **SHIFT** **F3** V-WIN.

Set the axes to show $0 \leq x \leq \pi$ with a scale of $\frac{\pi}{6}$ and
 $-10 \leq y \leq 10$ with a scale of 1.

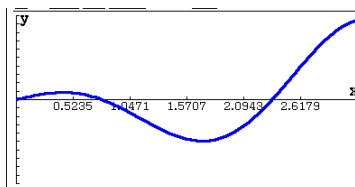
Leave the other items the same.

Press **EXIT** when you have finished.

```
View Window
Xmin : 0
max : 3.14159265
scale: 0.52359877
dot : 8.311x100 3
Ymin : -10
max : 10
[INITIAL] [TRIG] [STANDARD] [V-MEM] [SQUARE]
```

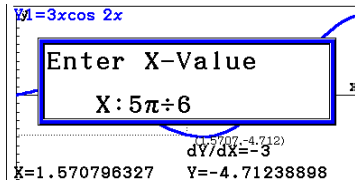
Press **F6** DRAW to display the graph screen.

The GDC displays the curve $Y1 = 3x \cos 2x$.



To find the gradient at $x = \frac{5\pi}{6}$ press **F1** Trace.

Type $5\pi \div 6$, the value of the x-coordinate, and press **EXE**.



The GDC displays a point on $y = 3x \cos(2x)$ and the gradient of the curve at that point.

$$y' \left(\frac{5\pi}{6} \right) = 15.1.$$

