Chapter 13 / **Example 5**

Modelling Change

Using functions can be an efficient way to make calculations with the GDC.

A company uses the function $C(x) = 100 + x - 0.01x^2 + 0.00006x^3$ to estimate the cost, in Euros, of producing *x* items. The revenue, in Euros, of selling *x* items is modelled by $R(x) = 22.8x - 0.001x^2$.

a Find the cost of producing 300 items.

b Find the marginal cost of producing 300 items and explain what this means, in context.

c Find the marginal profit of selling 300 items and explain what this means, in context.

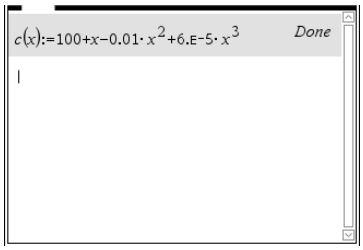
Open a new document and add a Calculator page.

You are first going to define the functions $C(x)$, $R(x)$ and a profit function $P(x)$.

Type C (X) then press ctrl (:=)

Type $100 + x - 0.01x^2 + 0.00006x^3$ and press enter.

To enter ^{3}, press ^ 3

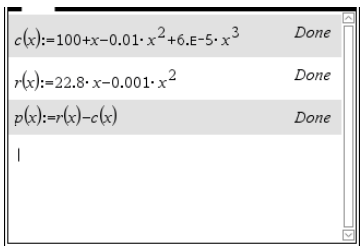


Type R (X) then press ctrl (:=)

Type $22.8x - 0.001x^2$ and press enter.

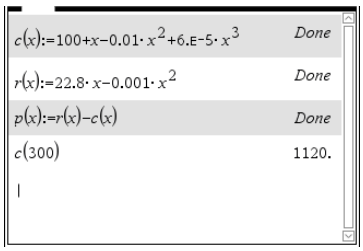
Type P (X) then press ctrl (:=)

Type $R(x) - C(x)$ and press enter.



Type C (300) and press enter.

The cost of producing 300 items is €1,120



Chapter 13 / **Example 5**

Modelling Change

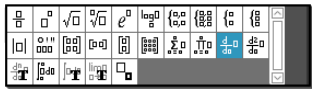
The marginal cost function is the derivative of the cost function. Use a GDC to find $C'(300)$.

Press [menu] and select $\frac{d}{d\square}\square$

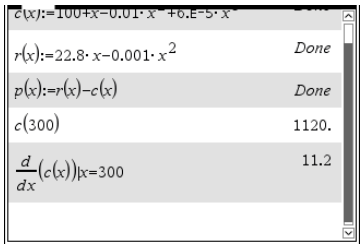
Enter X in the denominator ant the function C (X)

Enter [ctrl] [=] ([|≠≥▸]) and select the vertical bar (|)

Type X = 300 and press [enter].



The marginal cost of producing 300 items, $C'(300)$, is €11.20



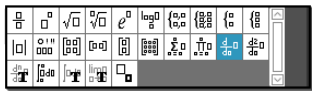
The marginal profit function is the derivative of the profit function. Use a GDC to find $P'(300)$.

Press [menu] and select $\frac{d}{d\square}\square$

Enter X in the denominator ant the function P (X)

Enter [ctrl] [=] ([|≠≥▸]) and select the vertical bar (|)

Type X = 300 and press [enter].



The marginal cost of selling 300 items, $P'(300)$, is €11.