

Chapter 4 / Example 7

Reciprocal functions

Chas and Dev are planning to print their sports team logo on baseball caps, and sell the caps. They have to hire a printing machine, which costs \$500, and it will cost them an additional \$5 for every cap to be bought and printed.

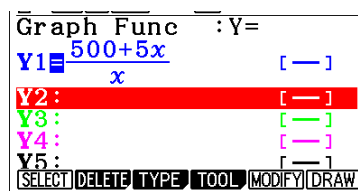
- Develop a model which links the number of caps they produce with average cost, per cap, they incur.
- Use your GDC to determine how many caps must be printed and sold if they are to sell the caps at \$7 per cap and just break even.

Let the number of caps produced be x , and the average cost incurred, per cap, be y , then $y = \frac{500 + 5x}{x}$

Press **MENU** 5 **GRAPH** to display the equation entry screen.

Press **□** to open the fraction template

Type $\frac{500 + 5x}{x}$ and press **EXE** to enter the equation as Y1.

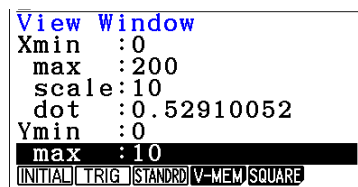


With the default axes, nothing will be displayed.

The y -axis will need to go from 1 to at least 7. You can investigate what values are needed for the x -axis by trying numbers for Xmax.

Press **SHIFT** **F3** V-WIN and set the axes so that $0 \leq x \leq 200$ and $0 \leq y \leq 10$ with scales of 10 and 1.

Press **EXIT** when you have finished.

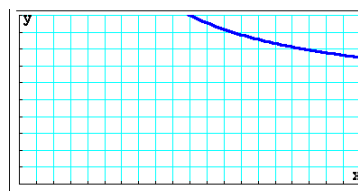


Press **F6** DRAW to display the graph screen

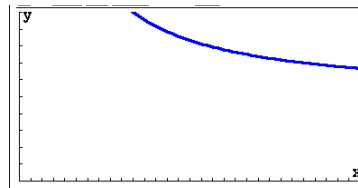
Clearly, if you need to see $y = 7$ then you will need a larger value of x than 200.

Press **SHIFT** **F3** V-WIN and change Xmax to 300 and press **EXE**.

Press **EXIT** and press **F6** DRAW.



The GDC now displays $y = \frac{500 + 5x}{x}$ in a suitable window.



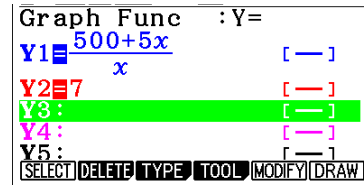
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You now need to Plot the line $y = 7$ on the same axes and find the intersection point.

Press **EXIT** to return to the equation entry screen.

Type 7 press **EXE** to enter the equation as Y2.

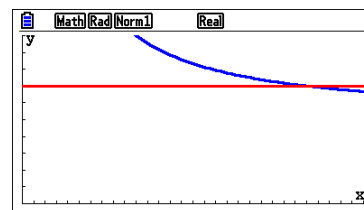


Press **F6** DRAW. The GDC now displays both graphs:

$$Y1 = \frac{500 + 5x}{x}$$

$$Y2 = 7$$

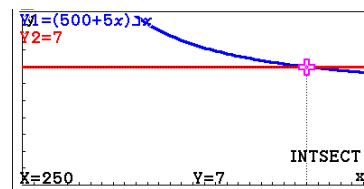
with suitable axes.



To find the intersection press **F5** G-Solv **F5** Intersect.

Press **EXE** to display the coordinates.

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



The GDC displays the intersection of the two straight lines at the point (250,7)

Chas and Dev must produce 250 caps to break even.

