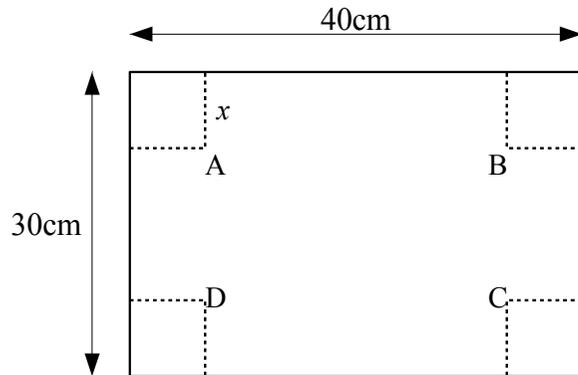


### Using Graphs to solve problems

- 1) An open box is to be made from a sheet of card 40cm by 30cm. A square of side  $x$  cm is to be cut from each corner, as shown in the diagram, and then the sides will be folded up so that the depth of the box will be  $x$  cm.



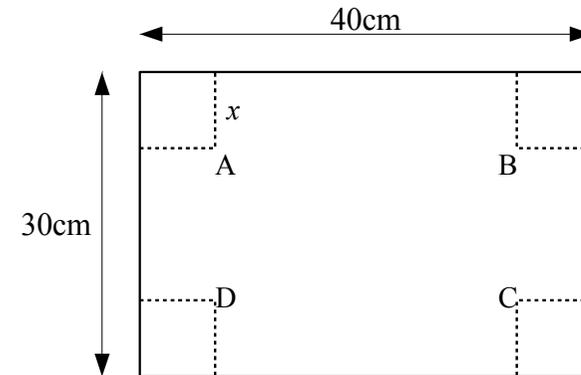
- Find in terms of  $x$  the length and width of the base of the box (ie AB and AD).
- The volume of the box is  $y$ . Write down an equation expressing  $y$  in terms of  $x$ .
- Draw a table of values of  $x$  and  $y$  for  $0 \leq x \leq 15$
- Draw a graph of  $y$  against  $x$ .
- What values of  $x$  give a volume of  $2500\text{cm}^3$ ?
- Use your graph to estimate the value of  $x$  which gives the box its maximum volume.
- Use trial and improvement to find this value of  $x$  to 2 decimal places. What is the maximum volume

- 2) The petrol consumption of a car ( $y$  miles per gallon) depends on the speed the car is travelling at ( $x$  mph), according to the formula  $y = 200 - 1.5x - \frac{4500}{x}$

- Draw the graph of this equation for  $40 \leq x \leq 80$ , taking a scale of 2cm to 5 units on each axis.
- What is the petrol consumption at 75mph?
- Use your graph to estimate the most economical speed at which to drive this car.
- Now use trial and improvement to find the most economical speed to 2 decimal places.

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