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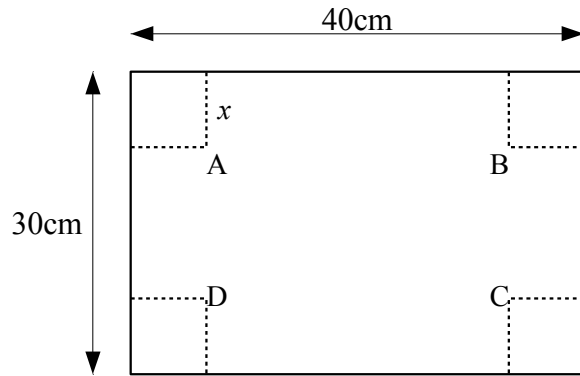
1) An open box is to be made from a sheet of card 40cm by 30cm. A square of side x cm is to be cut from each corner, as shown in the diagram, and then the sides will be folded up so that the depth of the box will be x cm.
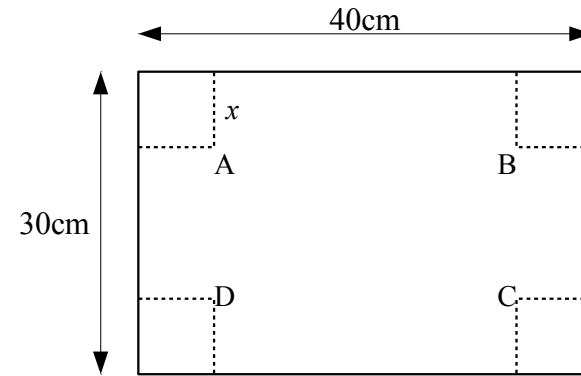

(a) Find in terms of x the length and width of the base of the box (ie AB and AD).
(b) The volume of the box is y. Write down an equation expressing y in terms of x.
(c) Draw a table of values of x and y for $0 \leq x \leq 15$
(d) Draw a graph of y against x.
(e) What values of x give a volume of 2500cm³?
(e) Use your graph to estimate the value of x which gives the box its 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 $y = 200 - 1.5x - \dfrac{4500}{x}$

(a) Draw the graph of this equation for $40 \leq x \leq 80$, taking a scale of 2cm to 5 units on each axis.
(b) What is the petrol consumption at 75mph?
(c) Use your graph to estimate the most economical speed at which to drive this car.