

**Example 1**

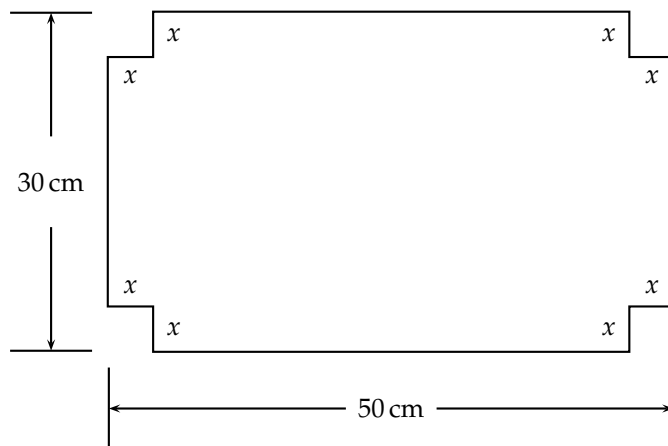
- (a) Solve the inequality  $\frac{x+7}{x-1} \leq x+2$ . Plot the solution on the number line and express the solution using interval notation. Hint: First write the inequality with zero on the right hand side, then get a common denominator on the left. **Do not clear the fraction.**
- (b) Draw the graphs of the two functions  $f(x) = \frac{x+7}{x-1}$  and  $g(x) = x+2$  on the same set of axes. Find the points of intersection of the two graphs and explain how the solution in part (a) relates to the two graphs.

**Example 2**

- (a) Find the equation of the line  $L_1$  joining the points  $A(2,1)$  and  $B(4,4)$ .
- (b) Find the equation of the line  $L_2$  through the point  $C(1,6)$  that is parallel to the line  $L_1$ .
- (c) Verify that the line joining the points  $B$  and  $C$  is perpendicular to lines  $L_1$  and  $L_2$ . Use this fact to find the distance between lines  $L_1$  and  $L_2$ .
- (d) Find the area of the triangle  $ABC$ .

**Example 3**

- (a) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 30 cm by 50 cm by cutting out equal squares of side length  $x$  at each corner and then folding up the sides, as shown. Express the volume  $V$  of the box as a function of  $x$ .



- (b) Give the domain of the function in part (a) that makes sense for the problem stated. Plot the function from part (a) and from your graph estimate the value of  $x$  that gives the maximum volume of the box.

**Example 4**

The graphs of the two functions  $f$  and  $g$  are shown.

- (a) Give the domain and range of both  $f$  and  $g$ .
- (b) Solve the equation  $g(x) = -1$ .
- (c) Given that the graph of  $g$  is a parabola, find a formula for the function  $g$ .
- (d) Find a formula for the piecewise function  $f$ .

