Answer all three questions from this section.

## Question 7

(50 marks)
A company has to design a rectangular box for a new range of jellybeans. The box is to be assembled from a single piece of cardboard, cut from a rectangular sheet measuring 31 cm by 22 cm . The box is to have a capacity (volume) of $500 \mathrm{~cm}^{3}$.

The net for the box is shown below. The company is going to use the full length and width of the rectangular piece of cardboard. The shaded areas are flaps of width 1 cm which are needed for assembly. The height of the box is $h \mathrm{~cm}$, as shown on the diagram.

(a) Write the dimensions of the box, in centimetres, in terms of $h$.

(b) Write an expression for the capacity of the box in cubic centimetres, in terms of $h$.

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(c) Show that the value of $h$ that gives a box with a square bottom will give the correct capacity.

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(d) Find, correct to one decimal place, the other value of $h$ that gives a box of the correct capacity.

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