5

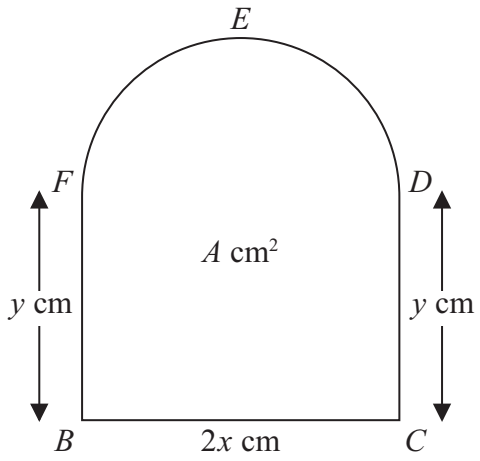

Diagram **NOT** accurately drawn

Figure 2

Figure 2 shows a shape *BCDEF* of area A cm^2. In the shape, *BCDF* is a rectangle and *DEF* is a semicircle with *FD* as diameter.

$BF = CD = y$ cm and $BC = FD = 2x$ cm. The perimeter of the shape *BCDEF* is 30 cm.

(a) Find an expression for y in terms of x.

(2)

(b) Show that $A = 30x - 2x^2 - \frac{1}{2}\pi x^2$

(2)

(c) Find, to 2 significant figures, the maximum value of A, justifying that the value you have found is a maximum.

(7)

Question 5 continued

Question 5 continued

(Total for Question 5 is 11 marks)