6. (a) Sketch the graph of the curve C with equation

$$y = \frac{4k}{x - 2k}$$

where k is a positive constant.

On your sketch show

- the coordinates of any points where C cuts the coordinate axes
- the equation of the vertical asymptote to C

(4)

The straight line l has equation

$$y = 6 - 2x$$

Given that there is at least one point of intersection between l and C,

(b) find the range of possible values of k.

(5)

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Question 6 continued

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Question 6 continued

(Total for Question 6 is 9 marks)

7.

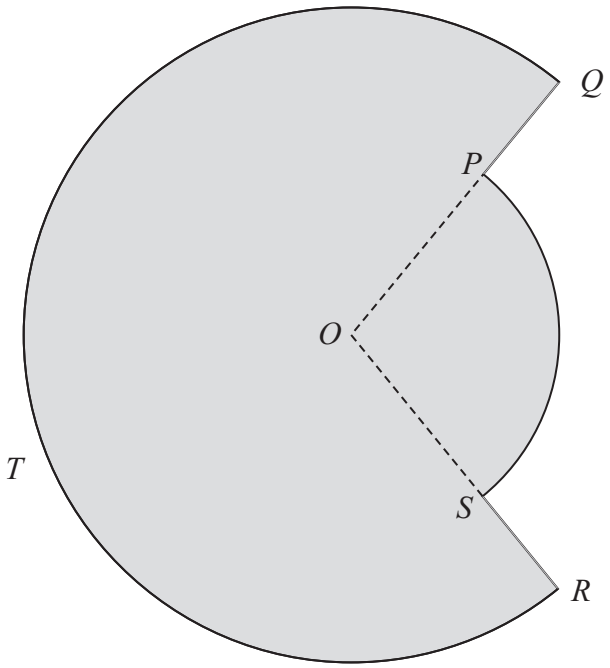

Figure 2

In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.

Figure 2 shows the plan view of a design for a swimming pool.

The design consists of a sector POS of a circle centre O joined to a major sector $QORTQ$ of a different circle, also with centre O.

Given that

- angle POS is 1.65 radians
- the area of sector POS is $30\,m^2$
- $PQ = 2.8\,m$

(a) show that, to 3 significant figures, $OQ = 8.83\,m$

(3)

(b) Find the total surface area of the swimming pool in m^2 to the nearest integer.

(3)

(c) Find the total perimeter of the swimming pool in metres to 2 significant figures.

(3)

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