

10 (a) Solve the equation

$$\tan x^\circ = -3 \quad \text{for } 0 \leq x < 360$$

Give your solutions to the nearest whole number.

(3)

Given that

$$7 \sin^2 \theta + \sin \theta \cos \theta = 6$$

(b) show that

$$\tan^2 \theta + \tan \theta - 6 = 0$$

(3)

(c) Hence solve the equation

$$7 \sin^2 y^\circ + \sin y^\circ \cos y^\circ = 6 \quad \text{for } 0 \leq y < 360$$

Give your solutions to the nearest whole number.

(4)

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Question 10 continued

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(Total for Question 10 is 10 marks)



11

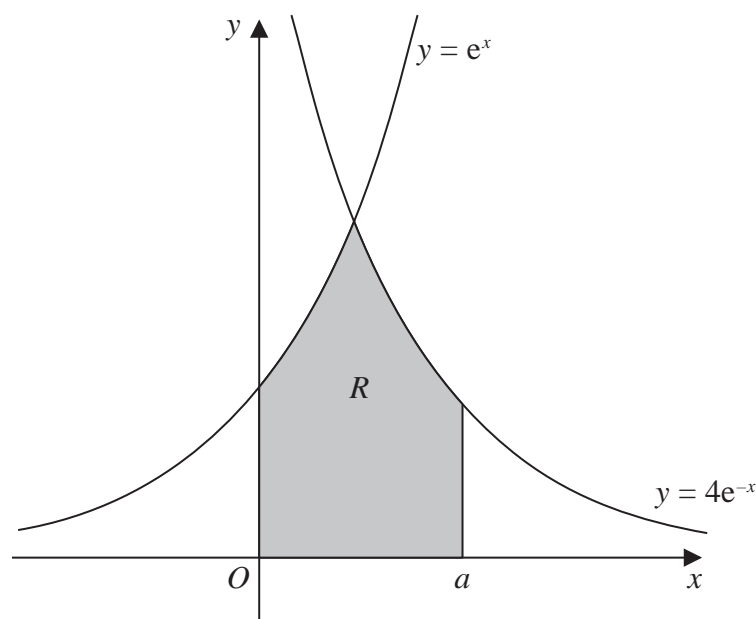


Figure 4

The region R , shown shaded in Figure 4, is bounded by the curve with equation $y = e^x$, the curve with equation $y = 4e^{-x}$, the straight line with equation $x = a$, the x -axis and the y -axis.

When the region R is rotated through 360° about the x -axis, the volume of the solid generated is

$$k - 8\pi e^{-4}$$

where k is a constant.

Using algebraic integration, find a possible value of a and the exact corresponding value of k .

(8)



Question 11 continued

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(Total for Question 11 is 8 marks)**TOTAL FOR PAPER IS 100 MARKS**