10

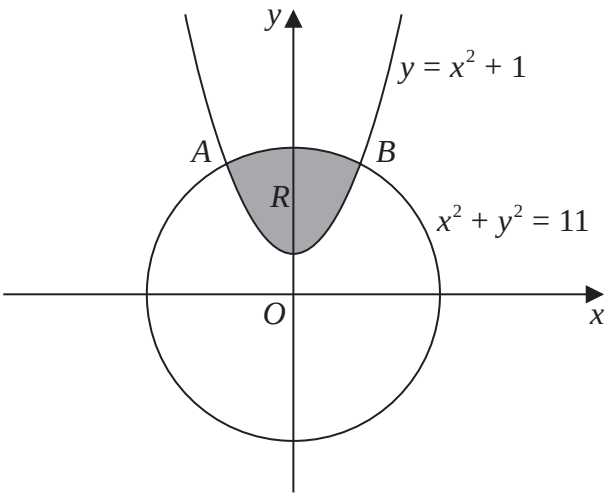

Diagram **NOT** accurately drawn

Figure 2

The region R, shown shaded in Figure 2, is bounded by the curve with equation $y = x^2 + 1$ and the curve with equation $x^2 + y^2 = 11$

The two curves intersect at the point A and at the point B.

(a) Find the x coordinate of the point A and the x coordinate of the point B.

(4)

The region R is rotated through 360° about the x-axis.

(b) Use algebraic integration to find the volume, to 2 decimal places, of the solid generated.

(5)

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 9 marks)

11

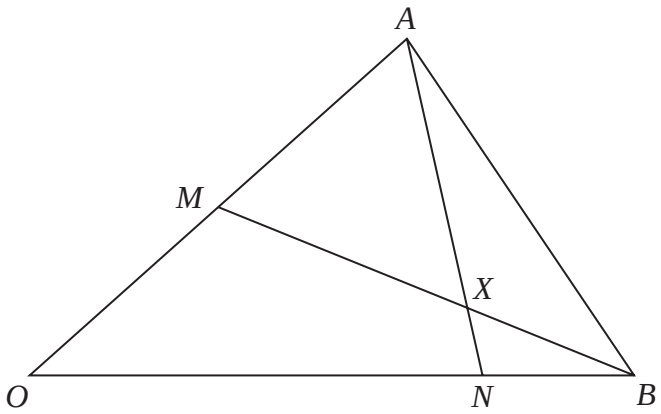

Diagram **NOT** accurately drawn

Figure 3

Figure 3 shows triangle OAB with $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$

M is the midpoint of OA.

N is the point on OB such that $ON : NB = 3 : 1$

The lines AN and BM intersect at the point X.

(a) Find expressions, in terms of **a** and **b**, for

(i) $\overrightarrow{AN}$ (ii) $\overrightarrow{BM}$

(3)

(b) Using a vector method, find $AX : XN$

(7)

Question 11 continued

Question 11 continued

(Total for Question 11 is 10 marks)

TOTAL FOR PAPER IS 100 MARKS