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18 Here is triangle ABC

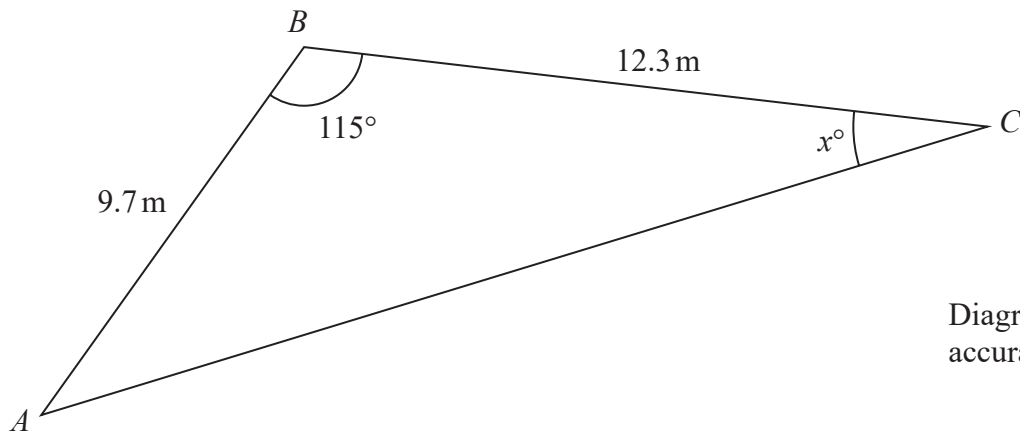


Diagram **NOT** accurately drawn

Work out the value of x
Give your answer correct to 3 significant figures.

$x = \dots\dots\dots$

(Total for Question 18 is 5 marks)



19

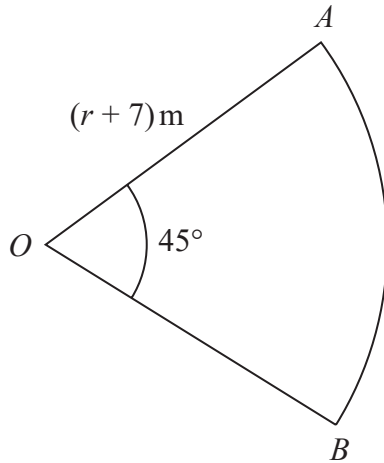


Diagram **NOT**
accurately drawn

OAB is a sector **S** of a circle with centre O and radius $(r + 7)$ metres.
Angle $AOB = 45^\circ$

A circle **C** has radius $(r - 2)$ metres.

The area of sector **S** is twice the area of circle **C**

Find the value of r

Show your working clearly.

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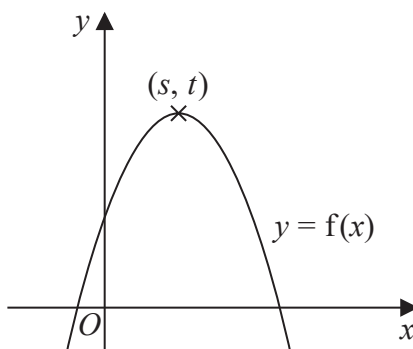


Question 19 continued.

$r = \dots\dots\dots$

(Total for Question 19 is 5 marks)

20 The diagram shows a sketch of part of the curve with equation $y = f(x)$



There is one maximum point on this curve.

The coordinates of this maximum point are (s, t)

Find, in terms of s and t , the coordinates of the maximum point on the curve with equation

(i) $y = f(x - 2)$

(.....,)
(1)

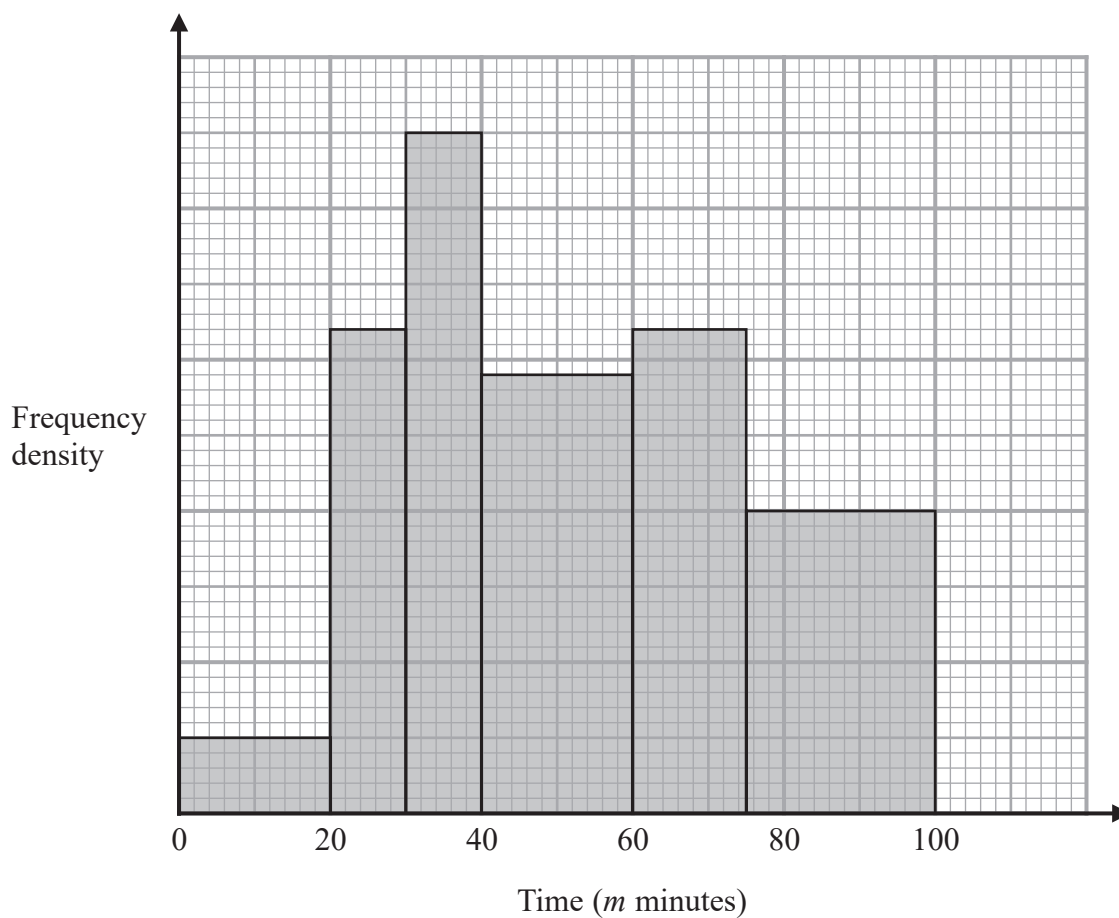
(ii) $y = 3f(x)$

(.....,)
(1)

(Total for Question 20 is 2 marks)



- 21 The histogram shows information about the total time, m minutes, taken by each child in a school to walk to school every day for one week.



There are no children for whom $m > 100$

There are 10 children for whom $m \leq 20$

Work out an estimate for the number of children for whom $50 < m \leq 80$

(Total for Question 21 is 3 marks)



22 A solid is made from a cone and a hemisphere.

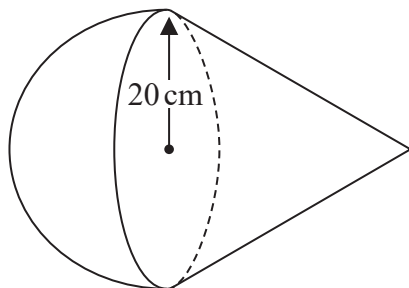


Diagram **NOT**
accurately drawn

The circular plane face of the hemisphere coincides with the circular base of the cone.
The radius of the hemisphere and the radius of the circular base of the cone are both 20 cm.

The curved surface area of the cone is $580\pi \text{ cm}^2$

The volume of the solid is $k\pi \text{ cm}^3$

Work out the exact value of k

$k = \dots\dots\dots$

(Total for Question 22 is 5 marks)



23 A polygon has n sides, where $n > 5$

When arranged in order of size, starting with the largest number, the sizes of the interior angles of the polygon, in degrees, are the terms of an arithmetic sequence.

Here are the first five terms of this sequence.

177 175 173 171 169

Find the value of n

Show clear algebraic working.



Question 23 continued

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$n = \dots\dots\dots$

(Total for Question 23 is 6 marks)

Turn over for Question 24



24 Express each of a , b and c in terms of q so that

$$q + 12x - qx^2$$

can be written as $a - b(x - c)^2$

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots$$

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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