

# GCSE Mathematics

## Practice Tests: Set 17

### Paper 2H/3H (Calculator)

**Time: 1 hour 30 minutes**

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

#### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- **Calculators may not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**



#### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

#### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

- 1** A train journey from Paris to Amsterdam took 3 hours 24 minutes.  
The total distance the train travelled was 433.5 km.

Work out the average speed of the train.  
Give your answer in kilometres per hour.

..... km/h

**(Total for Question 1 is 3 marks)**

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- 2 Kuro invests £50 000 for 3 years in a savings account.  
She gets 2.4% per year compound interest.

Work out how much money Kuro will have in her savings account at the end of the 3 years.  
Give your answer correct to the nearest £.

£.....

**(Total for Question 2 is 3 marks)**

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3 The table gives the length of the coastline, in kilometres, of each of five oceans.

Ocean	Length of coastline (km)
Arctic	$4.539 \times 10^4$
Atlantic	$1.119 \times 10^5$
Pacific	$1.357 \times 10^5$
Indian	$6.653 \times 10^4$
Southern	$1.797 \times 10^4$

(a) Which ocean has the greatest length of coastline?

.....  
(1)

(b) Calculate the difference between the length of the Atlantic Ocean's coastline and the length of the Southern Ocean's coastline.  
Give your answer in standard form.

..... km  
(2)

**(Total for Question 3 is 3 marks)**

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- 4 The diagram shows a rectangle  $ABCD$  and a semicircle with diameter  $AB$  where  $AB = 12$  cm. The point  $E$  lies on  $DC$  and also on the semicircle.

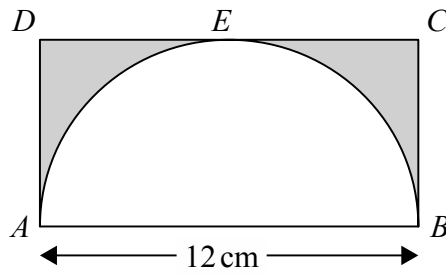


Diagram **NOT** accurately drawn

Work out the area of the shaded region.  
Give your answer correct to 3 significant figures.

.....  $\text{cm}^2$

**(Total for Question 4 is 3 marks)**

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- 5 The diagram shows a regular pentagon,  $ABCDE$ , a regular hexagon,  $CFGHID$ , and a quadrilateral,  $EDIJ$ .

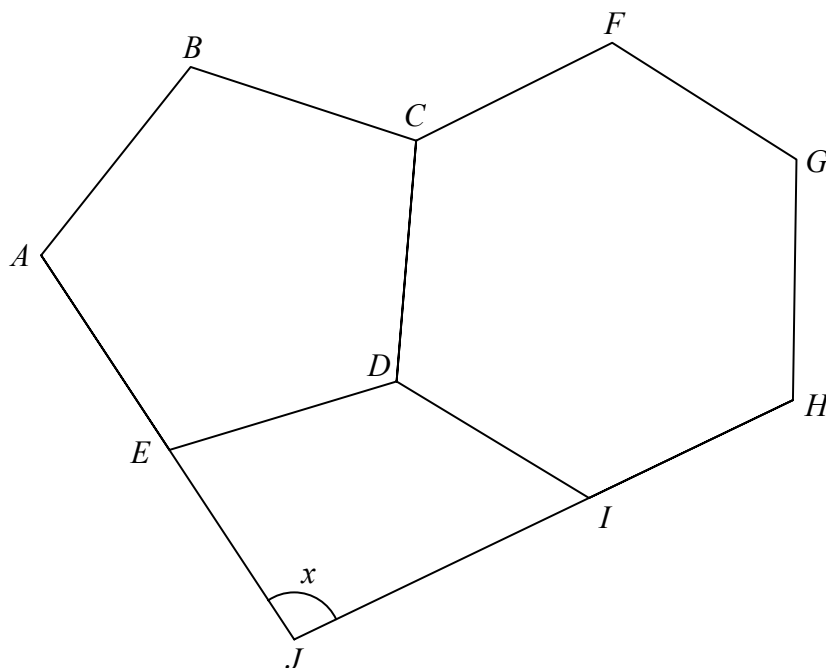


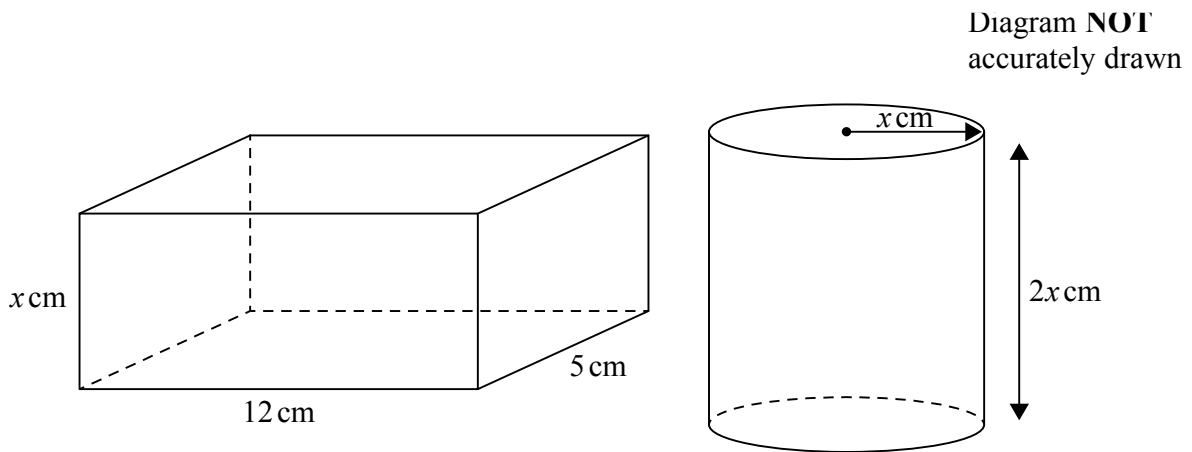
Diagram **NOT** accurately drawn

$AEJ$  and  $HIJ$  are straight lines.

Work out the size of the angle marked  $x$ .  
Show your working clearly.

.....°  
**(Total for Question 5 is 5 marks)**

6 The diagram shows a cuboid and a cylinder.



The dimensions of the cuboid are  $x$  cm by 12 cm by 5 cm.

The volume of the cuboid is  $270 \text{ cm}^3$

The radius of the cylinder is  $x$  cm.

The height of the cylinder is  $2x$  cm.

(a) Work out the volume of the cylinder.

Give your answer correct to the nearest whole number.

.....  $\text{cm}^3$   
(3)

(b) Change  $1 \text{ m}^3$  to  $\text{cm}^3$

.....  $\text{cm}^3$   
(1)

**(Total for Question 6 is 4 marks)**

- 7 A mathematics teacher at a school asked a group of students how far, in kilometres, each student had travelled to get to school that day.

The table gives information about their answers.

Distance travelled ( $d$ km)	Number of students
$0 < d \leq 2$	$x$
$2 < d \leq 4$	11
$4 < d \leq 6$	8
$6 < d \leq 8$	6
$8 < d \leq 10$	5

The teacher calculated that an estimate for the mean distance travelled by the whole group of students was 4.25 km.

Work out the value of  $x$ .  
Show your working clearly.

$x = \dots\dots\dots$

**(Total for Question 7 is 4 marks)**



- 8 The manager of a call centre asked the 120 people, who rang the call centre last week, how long they each waited before their call was answered.

The table gives information about their replies.

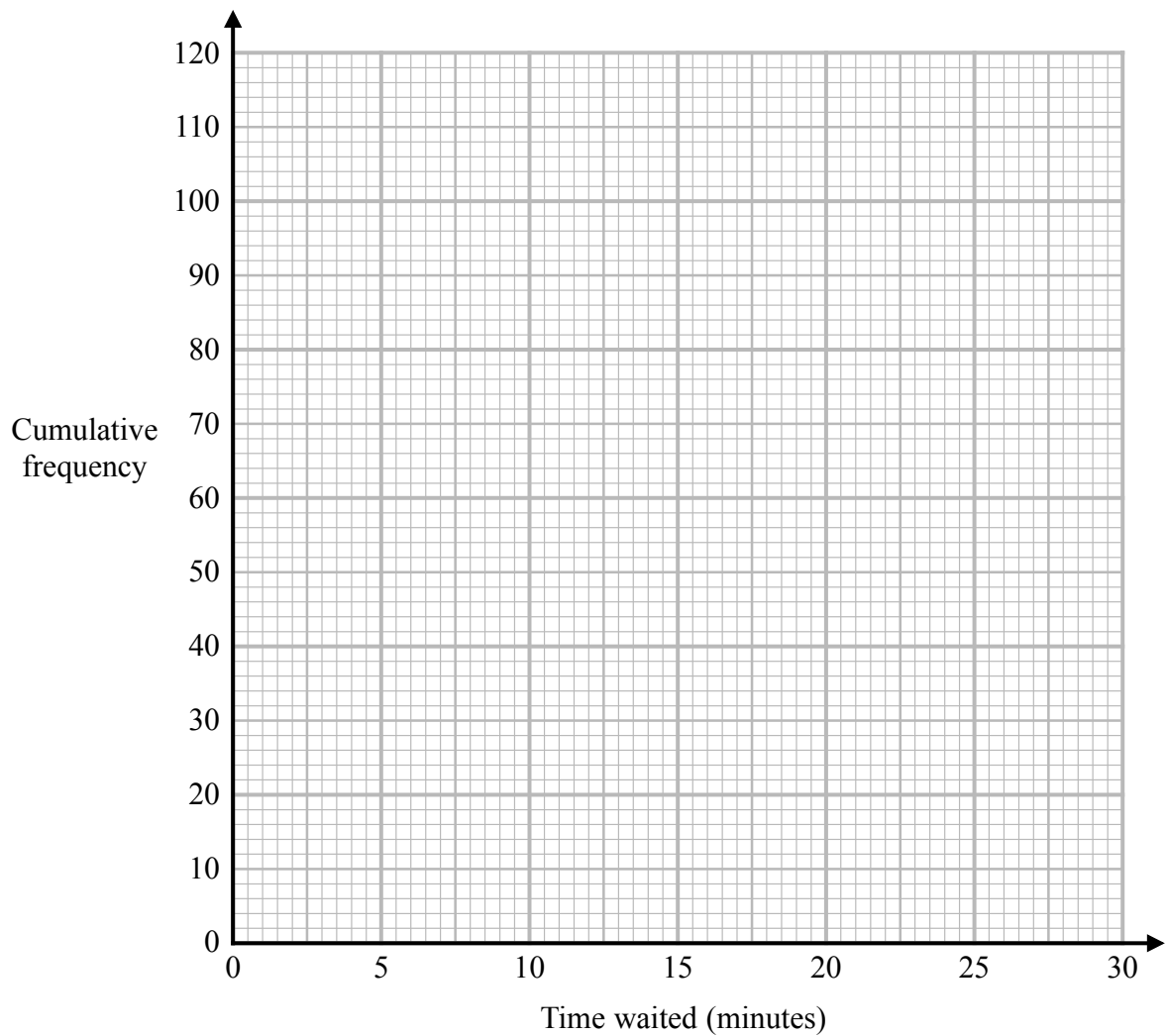
<b>Time waited (<math>t</math> minutes)</b>	<b>Frequency</b>
$0 < t \leq 5$	8
$5 < t \leq 10$	15
$10 < t \leq 15$	17
$15 < t \leq 20$	28
$20 < t \leq 25$	33
$25 < t \leq 30$	19

- (a) Complete the cumulative frequency table.

<b>Time waited (<math>t</math> minutes)</b>	<b>Cumulative frequency</b>
$0 < t \leq 5$	
$0 < t \leq 10$	
$0 < t \leq 15$	
$0 < t \leq 20$	
$0 < t \leq 25$	
$0 < t \leq 30$	

(1)

(b) On the grid below, draw a cumulative frequency graph for your table.



(2)

(c) Use your graph to find an estimate for the median of the times waited.

..... minutes

(1)

(d) Using your graph, find an estimate for the percentage of the 120 people who said that they waited longer than 23 minutes before their call was answered. Show your working clearly.

.....%

(2)

**(Total for Question 8 is 6 marks)**

9 Given that  $a < b < c$

the four whole numbers  $a, a, b$  and  $c$  have

- a mode of 7
- a median of 8.5
- a mean of 9

Work out the value of  $a$ , the value of  $b$  and the value of  $c$ .

$a =$  .....

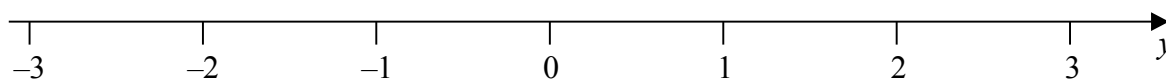
$b =$  .....

$c =$  .....

**(Total for Question 9 is 4 marks)**

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10 (a) On the number line, show the inequality  $-2 \leq y < 1$



**(2)**

$n$  is an integer.

(b) Write down all the values of  $n$  that satisfy  $-3.4 < n \leq 2$

.....  
**(2)**

**(Total for Question 10 is 4 marks)**

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- 11** On Wednesday, the price of 1 litre of petrol was £1.26  
The price of petrol on Wednesday was 5% more than the price of petrol on the previous Monday.

Calculate the price of 30 litres of petrol on the previous Monday.

£.....

**(Total for Question 11 is 3 marks)**

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- 12** The functions  $f$  and  $g$  are defined as

$$f(x) = x^2 + 6$$

$$g(x) = x - 10$$

- (a) Find  $fg(3)$

.....  
**(2)**

- (b) Solve the equation  $fg(x) = f(x)$   
Show clear algebraic working.

.....  
**(3)**

**(Total for Question 12 is 5 marks)**

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- 13 The diagram shows one face of a wall.  
This face is in the shape of a pentagon with exactly one line of symmetry.

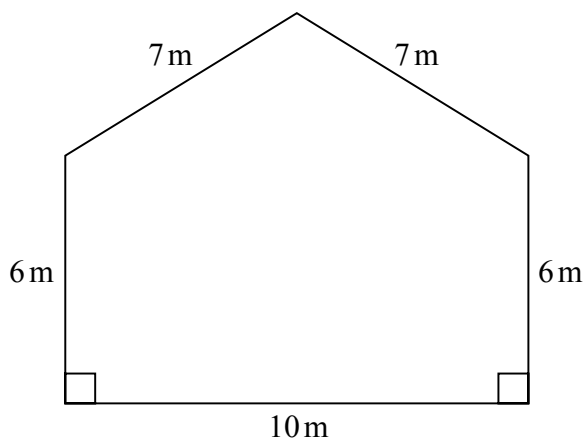


Diagram **NOT**  
accurately drawn

Omondi is going to paint this face of the wall once.  
He has to buy all the paint that he needs to use.

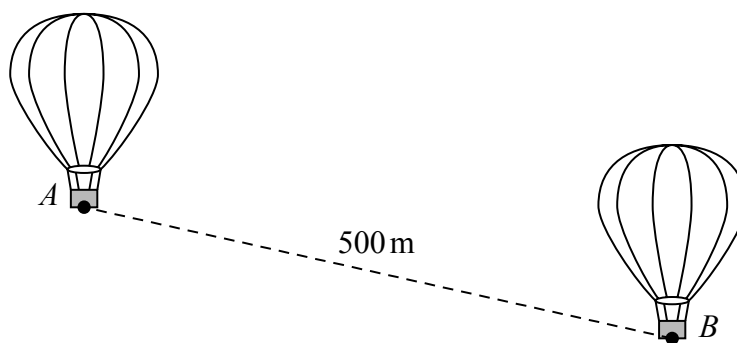
The paint in each tin of paint Omondi is going to buy will cover  $16 \text{ m}^2$  of the face of the wall.

Work out the least number of tins of paint Omondi will need to buy.  
Show your working clearly.

.....  
**(Total for Question 13 is 5 marks)**

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- 14 The diagram shows two hot air balloons.  
 $A$  is a point on the base of one of the balloons and  $B$  is a point on the base of the other balloon.



The distance between  $A$  and  $B$  is 500 metres.  
The angle of depression of  $B$  from  $A$  is  $23^\circ$

Calculate the vertical height of  $A$  above  $B$ .  
Give your answer correct to one decimal place.

..... metres

**(Total for Question 14 is 3 marks)**

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15  $k = \frac{t}{a - h}$

$t = 14$  correct to 2 significant figures

$a = 7.8$  correct to 2 significant figures

$h = 3.4$  correct to 2 significant figures

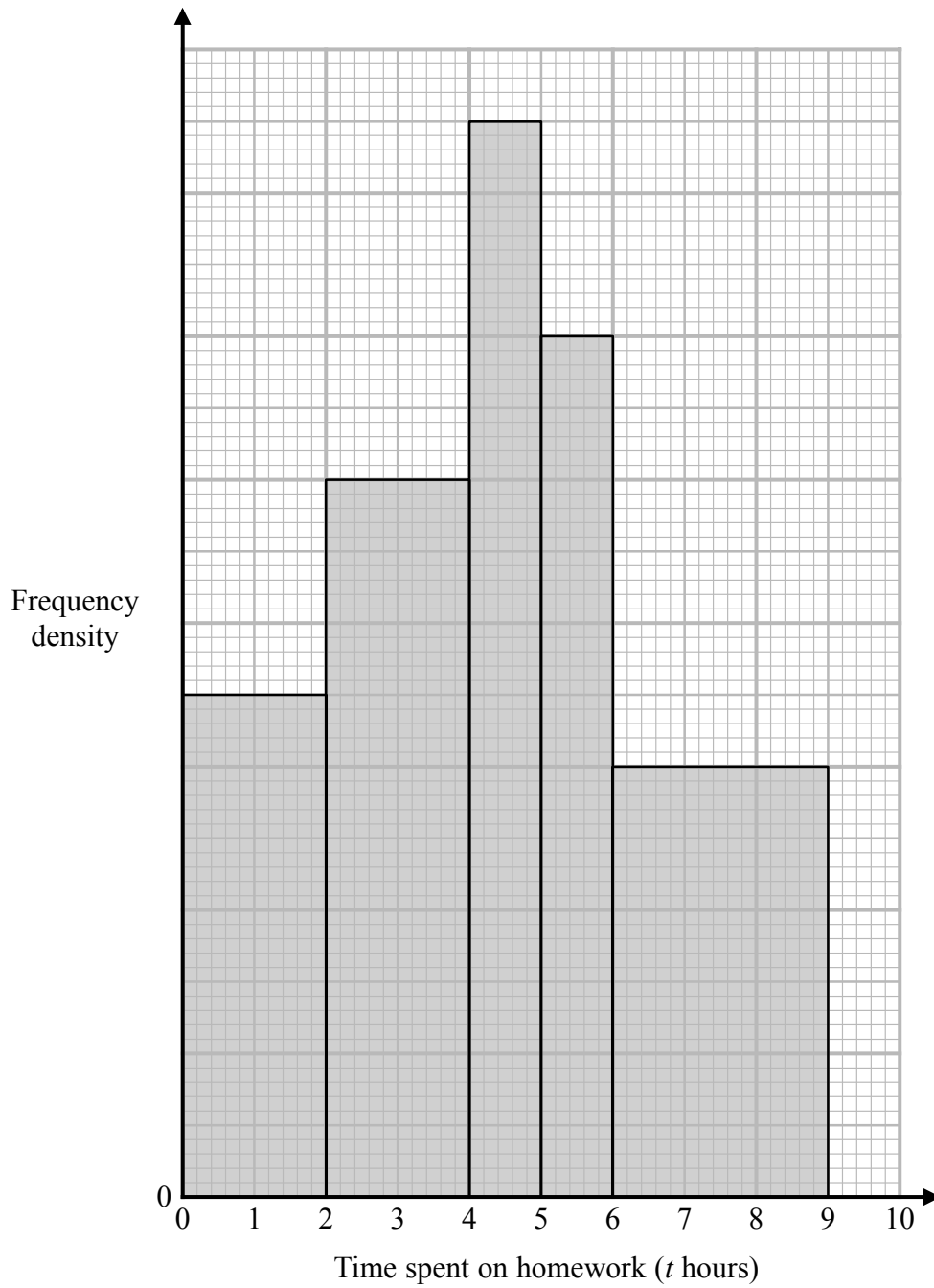
Work out the lower bound for the value of  $k$ .

Show your working clearly.

.....  
(Total for Question 15 is 3 marks)

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- 16 The histogram and the table give some information about the amounts of time, in hours, that Year 11 students at Bergdesh Academy spent, in total, on their homework last week. No student in Year 11 spent longer than 9 hours on their homework.





Time spent on homework ( $t$ hours)	Frequency
$0 < t \leq 2$	28
$2 < t \leq 4$	
$4 < t \leq 5$	
$5 < t \leq 6$	
$6 < t \leq 9$	

Using the information in the histogram and in the table, work out an estimate for the mean amount of time the Year 11 students spent on their homework last week. Give your answer in hours correct to 3 significant figures.

..... hours

**(Total for Question 16 is 5 marks)**

17 A circle centre  $O$  has radius 9 cm.

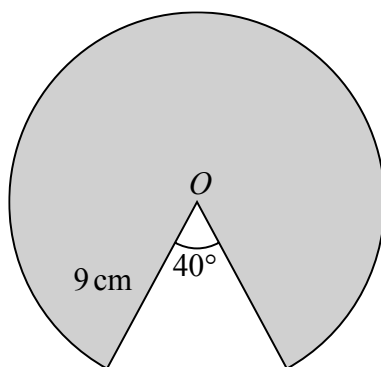


Diagram **NOT**  
accurately drawn

Calculate the perimeter of the shaded sector of the circle.  
Give your answer correct to 3 significant figures.

..... cm

**(Total for Question 17 is 4 marks)**

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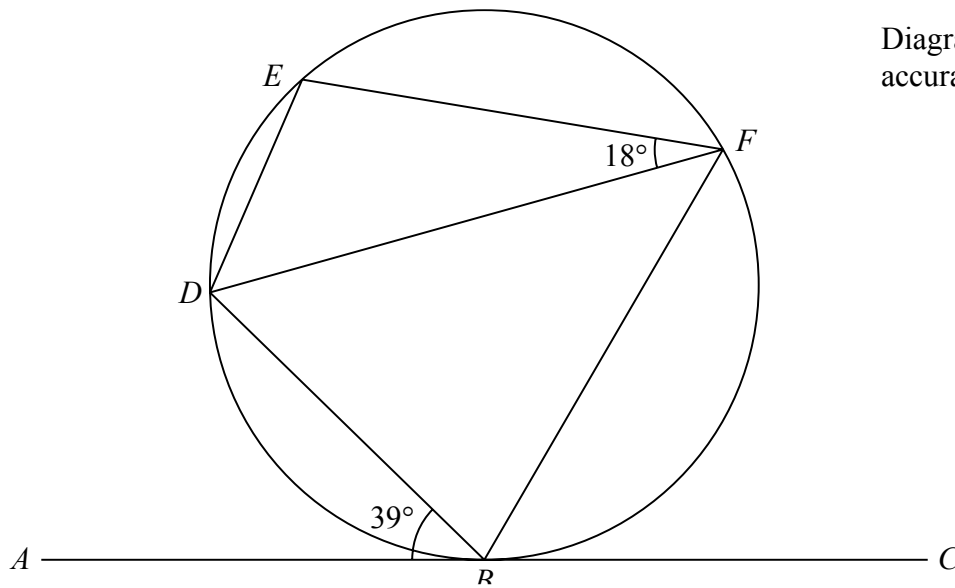


Diagram **NOT**  
accurately drawn

$B$ ,  $D$ ,  $E$  and  $F$  are points on a circle.

$ABC$  is the tangent at  $B$  to the circle.

Angle  $ABD = 39^\circ$

Angle  $EFD = 18^\circ$

Work out the size of angle  $BDE$ .

Give reasons for your working.

.....<sup>o</sup>  
(Total for Question 18 is 4 marks)



- 19** Simon bought a house at the beginning of 2018  
The value of Simon's house had decreased by 15% by the end of 2018  
The house increased in value during both 2019 and 2020  
The percentage increases in the value of the house during 2019 and 2020 were the same.  
The value of Simon's house at the end of 2020 was 2.85% greater than the amount he paid for his house at the beginning of 2018  
Calculate the percentage increase in the value of the house during 2019

.....%

**(Total for Question 19 is 4 marks)**

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20  $A$ ,  $B$  and  $C$  are points on a circle with centre  $O$ .

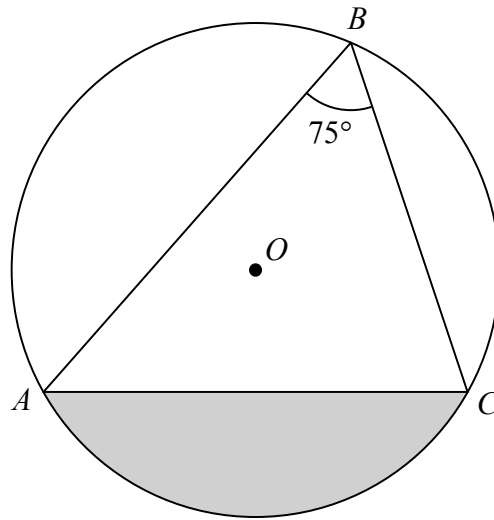


Diagram **NOT**  
accurately drawn

Angle  $ABC = 75^\circ$

The area of the shaded segment is  $200 \text{ cm}^2$

Calculate the radius of the circle.

Give your answer correct to 3 significant figures.

..... cm

**(Total for Question 20 is 5 marks)**

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**TOTAL FOR PAPER IS 80 MARKS**

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