Candidate Name	Centre Number					Candidate Number				
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GCSE

MATHEMATICS
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

SPECIMEN PAPER SUMMER 2017

1 HOUR 45 MINUTES

ADDITIONAL MATERIALS
The use of a calculator is not permitted in this examination.
A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES
Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided in this booklet.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

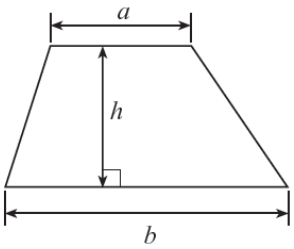
The number of marks is given in brackets at the end of each question or part-question.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**6**	
3.	**3**	
4.	**2**	
5.	**6**	
6.	**6**	
7.	**3**	
8.	**5**	
9.	**2**	
10.	**6**	
11.	**7**	
12.	**7**	
13.	**4**	
14.	**3**	
15.	**4**	
16.	**4**	
17.	**2**	
18.	**4**	
TOTAL	**80**	

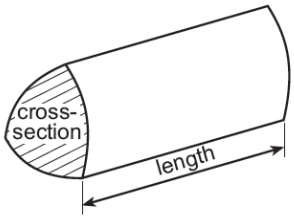
The assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing in question **8**.

Formula list

Area of a trapezium = $\frac{1}{2}(a+b)h$



Volume of a prism = area of cross section × length



1. Calculate the following.

(a) $5^2 \times 2^3$ [2]

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(b) $0{\cdot}3 \times 0{\cdot}6$ [1]

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(c) $8{\cdot}7 - 5{\cdot}25$ [1]

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(d) $\frac{7}{8} - \frac{1}{4}$ [2]

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2. (*a*) Write down the next two numbers in the following sequence. [2]

18 17 14 9 ....

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(*b*) Simplify the expression $7x + 3y - 5x - 6y$. [2]

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(*c*) Using the formula $N = 7D + 3E$, find the value of E when N = 26 and D = 2. [2]

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3. Circle the correct answer for each of the following statements.

(a) The area of the right-angled triangle drawn below is

240 cm^2 60 cm^2 260 cm^2 120 cm^2 6240 cm^2

[1]

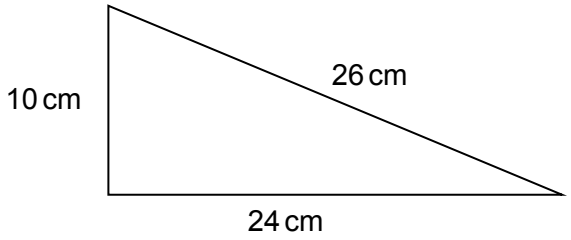

Diagram not drawn to scale

(b) The value of x shown in the triangle below is

40° 20° 9° 180° $\frac{1}{9}$°

[1]

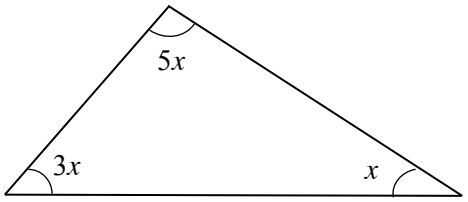

Diagram not drawn to scale

(c) The volume of the cuboid shown below is

30 m^3 10 m^3 31 m^3 62 m^3 235 m^3

[1]

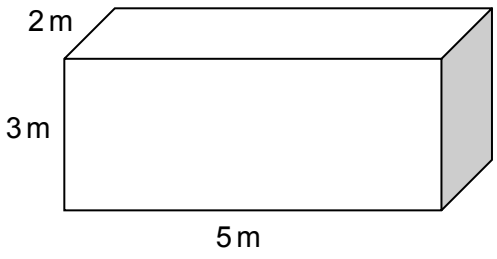

Diagram not drawn to scale

4. Beti is twice as old as Afraz.
Huw is three years younger than Beti.
The sum of the ages of these three people is 37 years.

Calculate the age of each of these three people. [2]

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Afraz is .....years old Beti is .....years old Huw is .....years old

5. In a game, cards are chosen at random from two boxes.
One card is chosen at random from box A and one card is chosen at random from box B.

Box A contains these two cards. | **−3** | | **+3** |

Box B contains these five cards. | **−2** | | **−1** | | **0** | | **+1** | | **+2** |

The two numbers on the chosen cards are multiplied together to give a score.
The person choosing the cards wins a prize if the score is more than zero.

Complete the table below to show all the possible scores and calculate an estimate for the number of prize winners when 70 people play the game once. [6]

		Box B				
		−2	−1	0	+1	+2
Box A	−3				**−3**	**−6**
	+3				**+3**	**+6**

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6. Solve each of the following equations.

(a) $7x - 4 = 2x + 11$ [3]

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(b) $3(2x + 7) = 9$ [3]

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7. Are the following statements true or false? Circle the correct answer.
You must give a full explanation of your decision in each case.

(a)
When a number that ends in 8 is divided by 2, the answer is always a multiple of 4. [1]

true / false

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(b)
When two consecutive whole numbers are multiplied together, the answer is always an even number. [2]

true / false

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8. *You will be assessed on the quality of your organisation, communication and accuracy in writing in this question.*

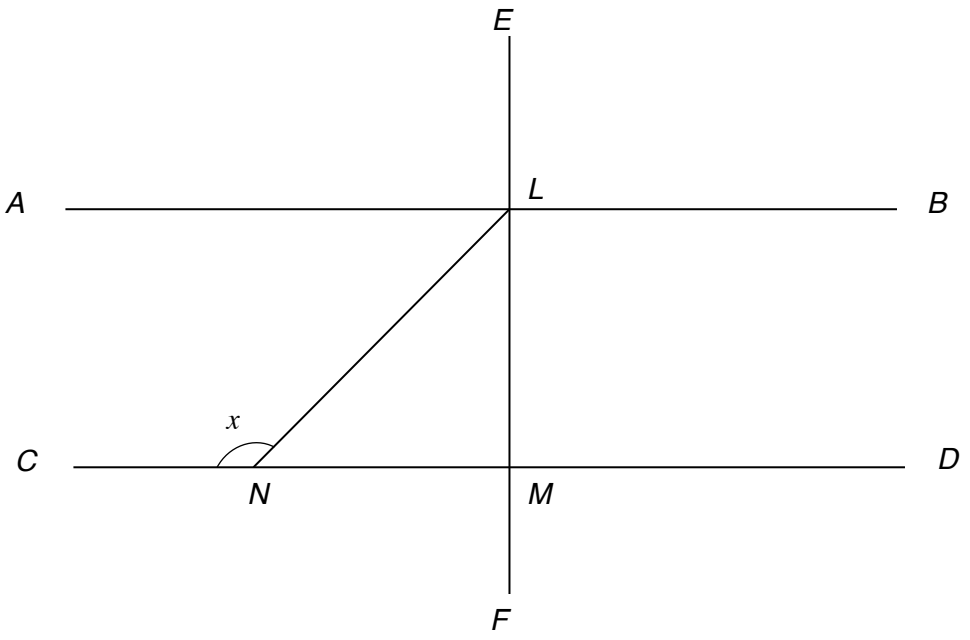

Diagram not drawn to scale

The line *AB* is parallel to the line *CD*.
The line *CD* is perpendicular to the line *EF*.
Triangle *LMN* is an isosceles triangle.
Find the size of angle x.
You must show all your working. [5]

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9. Select four **different** whole numbers between 1 and 9 inclusive such that,

- their mean is 6
- their range is 5. [2]

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Answer: ……. ……. ……. …….

10. Mair either walks, cycles, travels by car or travels by bus to work each day.
Her method of travel each day is independent of her method of travel on any other day.

The table below shows the probability for three of her methods of travel on any randomly chosen day.

Method of travel	Walk	Bike	Car	Bus
Probability		0·45	0·1	0·25

(a) Calculate the probability that, on any randomly chosen day, she walks to work. [2]

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(b) What is the probability that, on any randomly chosen day, she either travelled to work by car or by bus? [2]

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(c) What is the probability that, in any randomly chosen week, Mair travelled to work by car on the Monday and by bus on the Tuesday? [2]

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11. *(a)* The table below shows some of the values of $y = x^2 - 3x - 2$ for values of x from -2 to 4.

Complete the table by finding the value of y for $x = 2$. [1]

x	-2	-1	0	1	2	3	4
$y = x^2 - 3x - 2$	8	2	-2	-4		-2	2

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(b) On the graph paper opposite, draw the graph of $y = x^2 - 3x - 2$ for values of x from -2 to 4. [2]

(c) Using your graph, write down the two solutions of the equation $x^2 - 3x - 2 = 0$.
Give your answers correct to 1 decimal place. [1]

Solutions are ..... and .....

(d) By drawing a suitable line on your graph, write down the two solutions of the equation $x^2 - 3x + 1 = 0$.
Give your answers correct to 1 decimal place. [3]

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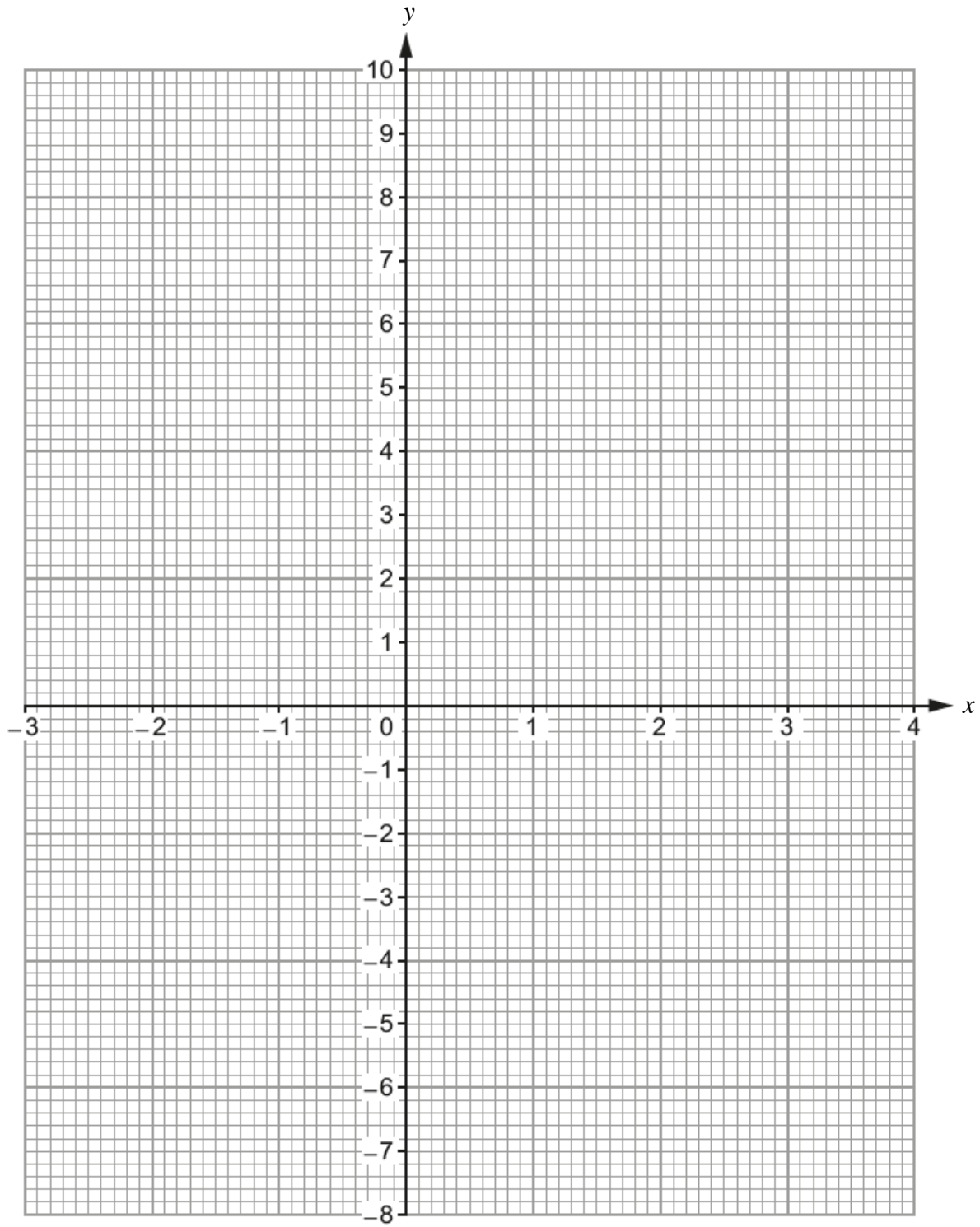
Solutions are ..... and .....

For use with question 11.



12. *(a)* Use a ruler and a pair of compasses to construct an angle $F\hat{G}H$ of size 30° at point *G*. [3]

F ——————————————————————— *G*

(b) A regular polygon has interior angles of 135°.
How many sides does this polygon have? [3]

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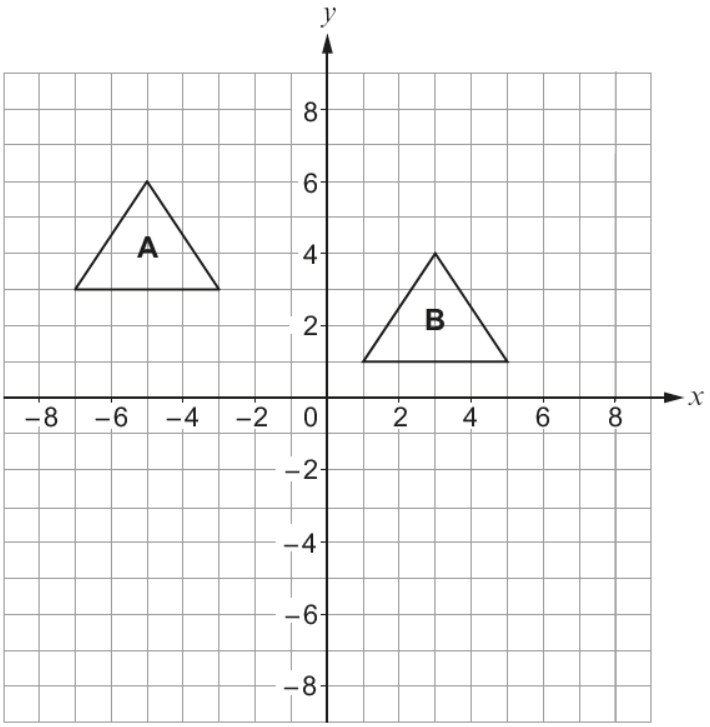
(c) Shape A is translated onto Shape B.



Which one of the following vectors describes the translation?
Circle your answer. [1]

$\begin{pmatrix} 8 \\ -2 \end{pmatrix}$ $\begin{pmatrix} 2 \\ -8 \end{pmatrix}$ $\begin{pmatrix} -8 \\ -2 \end{pmatrix}$ $\begin{pmatrix} -2 \\ 8 \end{pmatrix}$ $\begin{pmatrix} -8 \\ 2 \end{pmatrix}$

13. *(a)* Calculate the largest share when £400 is shared in the ratio 1 : 2 : 5. [2]

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(b) A price of £63 includes VAT at a rate of 5%.
What was the price before VAT was added? [2]

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14. Circle your answer in each of the following.

(a) The value of 2^{-3} as a fraction in its simplest form is

$\frac{1}{6}$ $-\frac{1}{6}$ $-\frac{1}{8}$ $\frac{1}{8}$ $-\frac{2}{3}$

[1]

(b) $\frac{2}{9}$ as a recurring decimal is

0·2929…… 0·2999……. 0·9292….. 0·9222…. 0·2222….

[1]

(c) 17^0 is equal to

17 1 0 $\frac{1}{17}$ 1·7

[1]

15. A six-sided dice was thrown repeatedly.
After every 100 throws, the **cumulative** number of sixes thrown was recorded.

(a) Complete the table below, which gives a summary of the results obtained. [1]

Number of throws	100	200	300	400	500
Number of sixes	8	28	60	72	80
Relative frequency	0·08	0·14		0·18	

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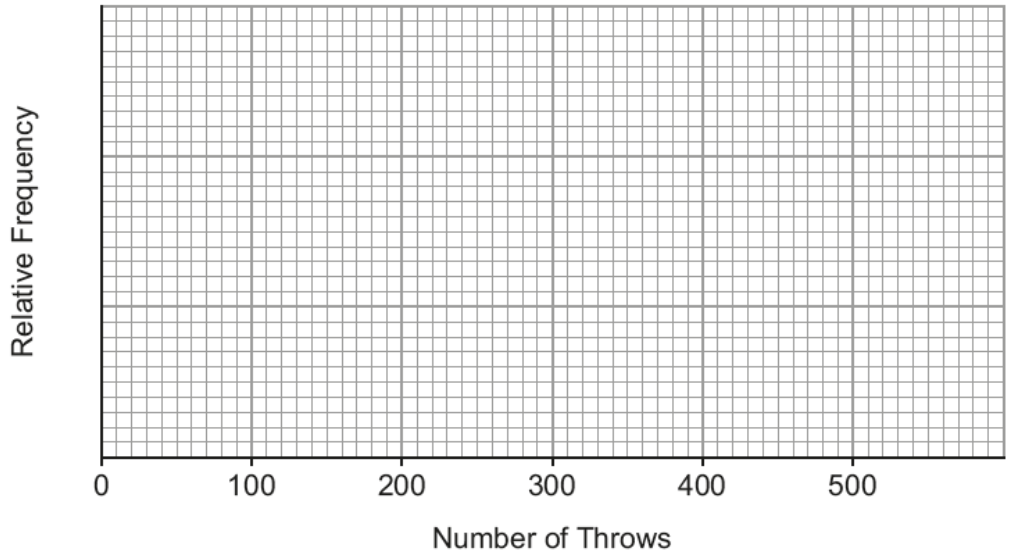
(b) Draw a relative frequency diagram to show the information given in the table. [1]



(*c*) From the table, which value gives the best estimate for the probability of throwing a six? You must give a reason for your choice. [1]

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(*d*) Do you think this is a fair dice? You must give a reason for your choice. [1]

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16. Find, in standard form, the value of

(a) $(4{\cdot}1 \times 10^{-5}) \times 3000$, [2]

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(b) $(1{\cdot}5 \times 10^{3}) \div (3 \times 10^{6})$. [2]

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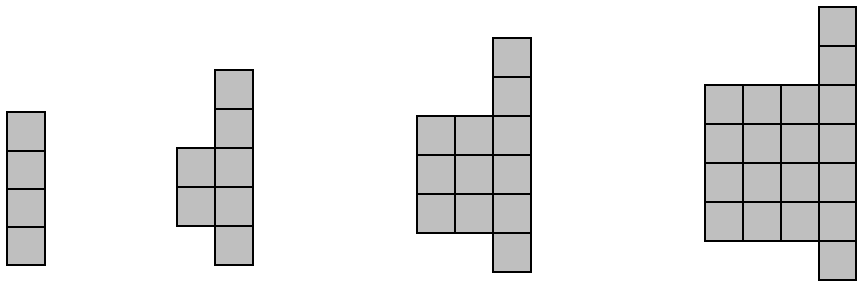
17. The diagram shows the first four patterns of a sequence.



1 2 3 4

Find an expression for the number of squares in the nth pattern of the sequence. [2]

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18. The points *A*, *B*, *C* and *D* lie on the circumference of a circle centre *O* and $B\hat{C}D = 62°$.

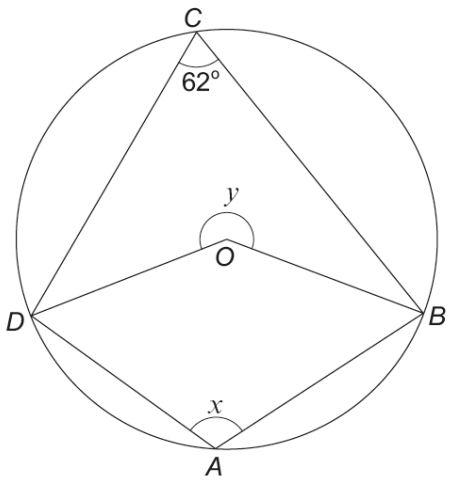

Diagram not drawn to scale

(a) Find the size of angle x, giving a reason for your answer. [2]

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(b) Find the size of angle y, giving a reason for your answer. [2]

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