wjec cbac

GCSE

3300U30-1

S18-3300U30-1

MATHEMATICS
UNIT 1: NON-CALCULATOR
INTERMEDIATE TIER

THURSDAY, 24 MAY 2018 – MORNING

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

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

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.

If you run out of space, use the continuation page at the back of the booklet. Question numbers must be given for all work written on the continuation page.

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.

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

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

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Formula List – Intermediate Tier

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

Volume of prism = area of cross-section × length

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1. Using only the numbers in the following list,

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

write down

(a) two **prime** numbers that have a sum of 32, [2]

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The two numbers are .... and ....

(b) a number that is a multiple of **both** 4 **and** 6, [2]

....

(c) a number that is a factor of 51. [1]

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2. Circle the correct answer for each of the following.

(a) 16 km is approximately equal to [1]

      5 miles   8 miles   10 miles   16 miles   32 miles

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(b) 2·2 lb is approximately equal to [1]

      1 kg   2 kg   4·4 kg   5 kg   10 kg

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(c) 4 litres is approximately equal to [1]

      4 pints   5 pints   6 pints   7 pints   8 pints

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3. The table below shows some values of $y = x - 3$ for values of x from -4 to 6.

x	-4	-2	0	2	4	6
$y = x - 3$	-7		-3			3

(a) Complete the table above. [2]

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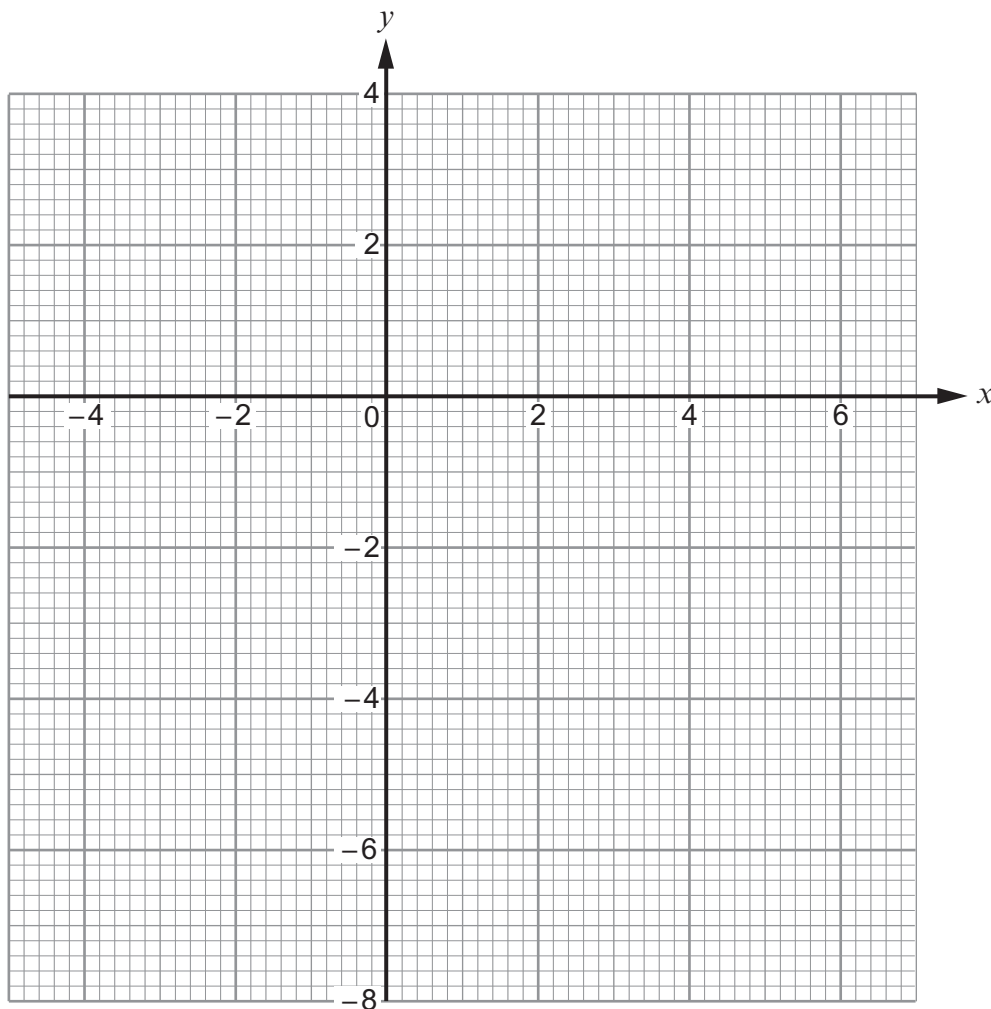
(b) On the graph paper below, draw the graph of the straight line $y = x - 3$ for values of x **from −4 to 6 only**. [2]

(c) The straight line you have drawn on the graph for values of x **from −4 to 6** is a diagonal of a square.

Write down the coordinates of the four corners of this square. [2]

(.............. , ...)   (.............. , ...)   (.............. , ...)   (.............. , ...)

4. A bag contains a number of different coloured balls.
A ball is selected at random from the bag.
The probability of selecting a blue ball is 0·3.

(a) Why is the following statement incorrect?
Explain your answer clearly. [1]

'More than half the balls in the bag are blue.'

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(b) What is the probability that a ball selected at random from the bag is not blue? [1]

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(c) There are 50 balls in the bag.
How many of them are blue? [2]

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5. *(a)* Draw an isometric representation of a cuboid measuring 6 cm by 4 cm by 3 cm.
Use the grid below. [2]

(b) Calculate the volume of the cuboid.
Give the units of your answer. [3]

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6. *(a)* The table below shows the first five terms of a sequence of numbers.

Term	t_1	t_2	t_3	t_4	t_5
Value	2	5	8	11	14

Circle the correct equation that connects terms t_6 and t_7. [1]

$t_6 = t_7 + 3$ $t_7 = t_6 + 14$ $t_7 - t_6 = 1$ $t_7 = t_6 - 3$ $t_7 = t_6 + 3$.

(b) The nth term of another sequence is given by $2n - 11$.

Write down the value of,

(i) the 10th term, [1]

(ii) the 3rd term. [1]

(3300U30-1) **Turn over.**

7. Find the whole number that satisfies all of the following conditions.

- It is a whole number between 1 and 100 inclusive.
- 10% of the number is greater than 2 but less than 8.
- $\frac{1}{2}$ of the number is a square number.
- The number is **not** a multiple of 4.   [3]

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The number is ....

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

In the diagram below, *ABCE* is a square whose perimeter is 28 cm.
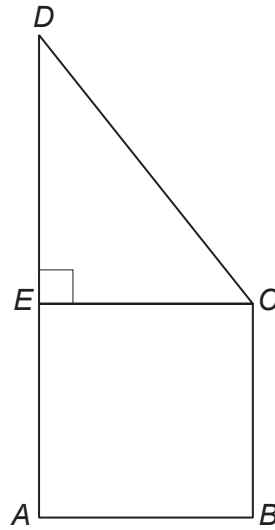*CDE* is a right-angled triangle whose area is 35 cm².

Diagram not drawn to scale

Calculate the length of *DE*.
You must show all your working. [4 + 2 OCW]

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(3300U30-1) **Turn over.**

9. *(a)* Reflect the shape S in the line $y = 1$. [2]

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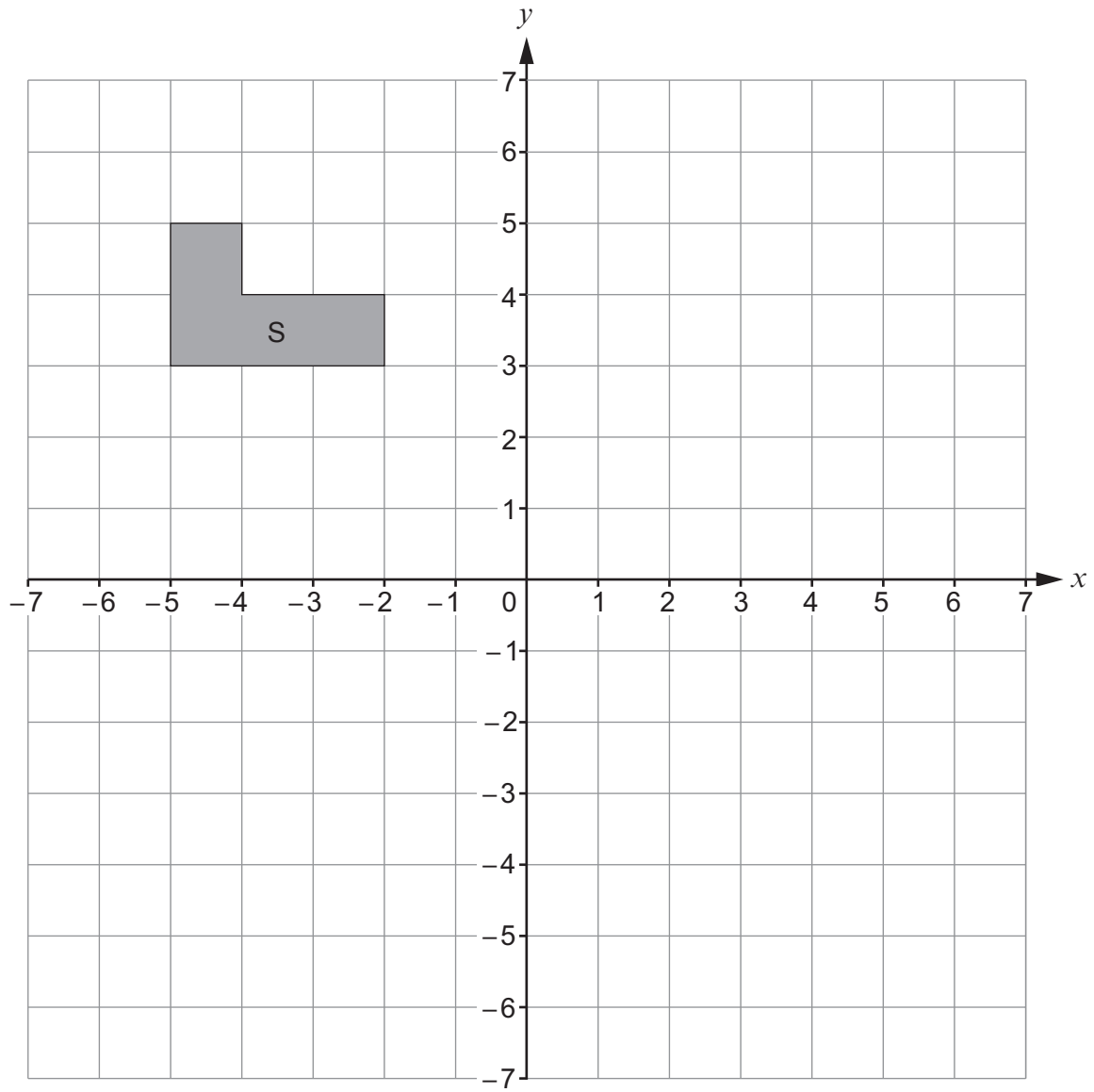
(b) Describe **fully** the **single** transformation that transforms shape S to shape T. [3]

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Turn over.

10. *(a)* Circle the **best** approximate value for the following calculation. [1]

$$\frac{596\cdot3}{38\cdot2 + 11\cdot5}$$

| 110 | 12 | 11 | 120 | 10 |

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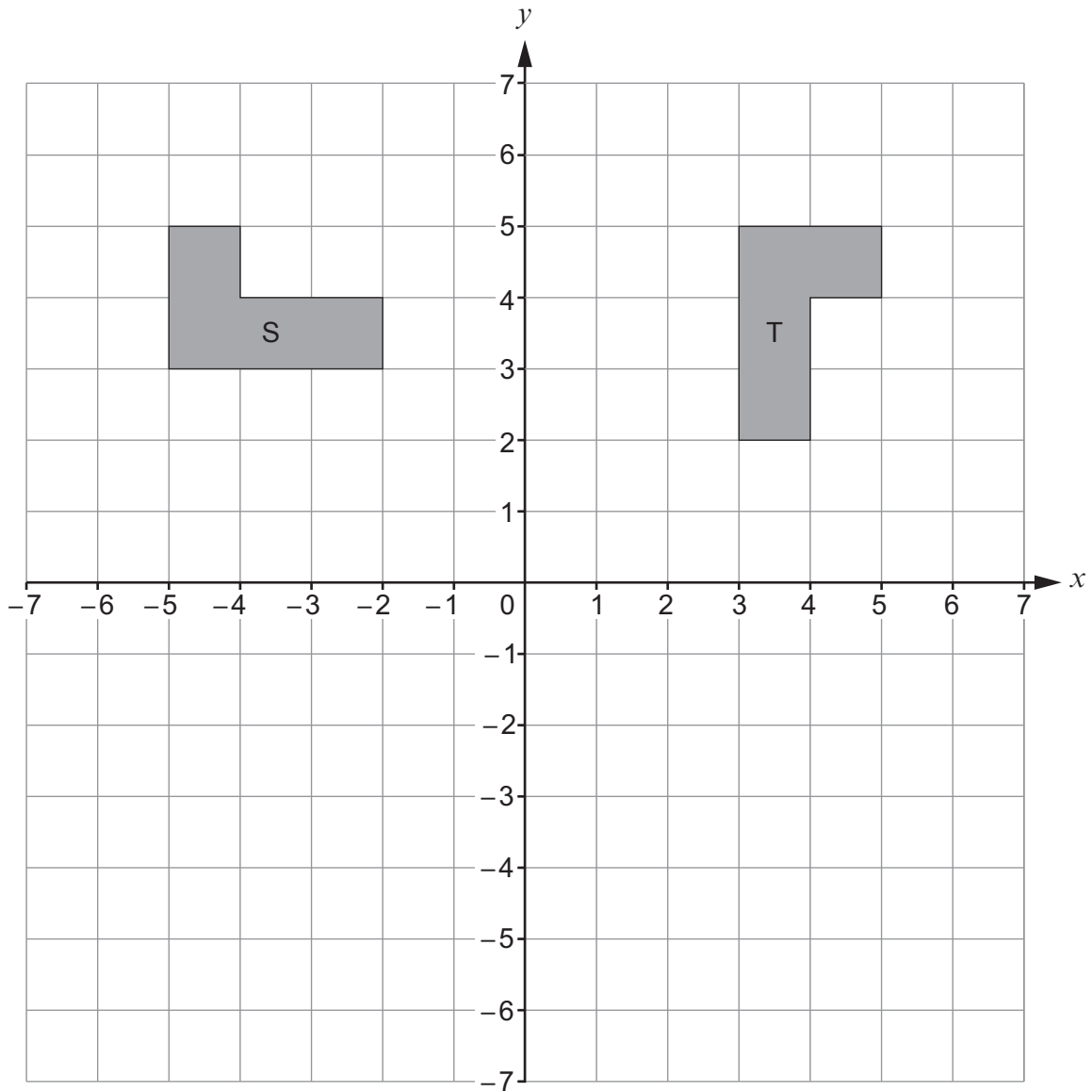
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(b) A number is increased by 4% of its value.
This is done 7 times, each time increasing the previous value by 4%.
Circle the multiplier that you would use to find the value after the 7 increases. [1]

| $\times 1\cdot04^7$ | $\times 1\cdot4^7$ | $\times 0\cdot04^7$ | $\times 1\cdot04^6$ | $\times 1\cdot28$ |

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(c) Calculate $\dfrac{4}{5} \div \dfrac{1}{4}$.

Circle the correct answer. [1]

| $1\dfrac{3}{5}$ | $\dfrac{1}{5}$ | $\dfrac{5}{16}$ | 5 | $3\dfrac{1}{5}$ |

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11. 30 rugby supporters travel to Cardiff on a coach.
They decide to investigate how many of them can sing one, or both, of the songs
'Hen Wlad fy Nhadau' and *'Bread of Heaven'*.

- 12 say they can sing both songs.
- 18 say they can sing *'Bread of Heaven'*.
- 5 say they cannot sing either of the songs.

(a) Complete the Venn diagram below to show this information.
The universal set, ε, contains all of the 30 supporters on the coach. [3]

ε

*Hen Wlad
fy Nhadau*

*Bread of
Heaven*

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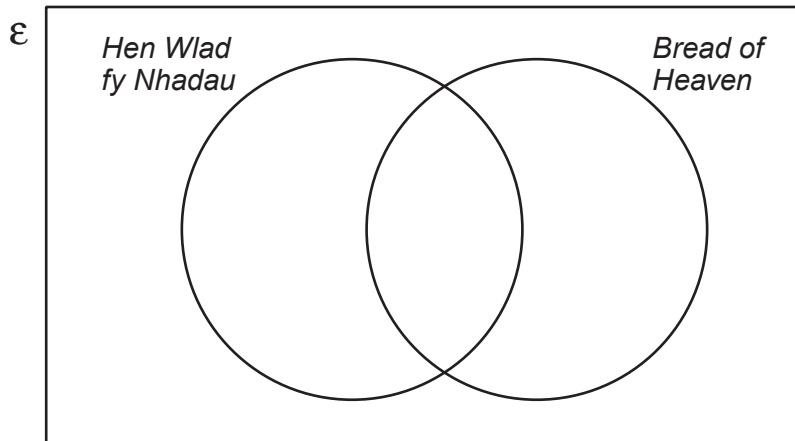
(b) One of these supporters is chosen at random.
What is the probability that this person can sing *'Hen Wlad fy Nhadau'*? [2]

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12. *(a)* Expand and simplify the following expression. [4]

$$x(5x - 2) - 3(x^2 - 2x + 7)$$

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(b) Solve $\dfrac{22 - f}{3} = 6$. [3]

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13. *(a)* A fair, six-sided dice is thrown twice.
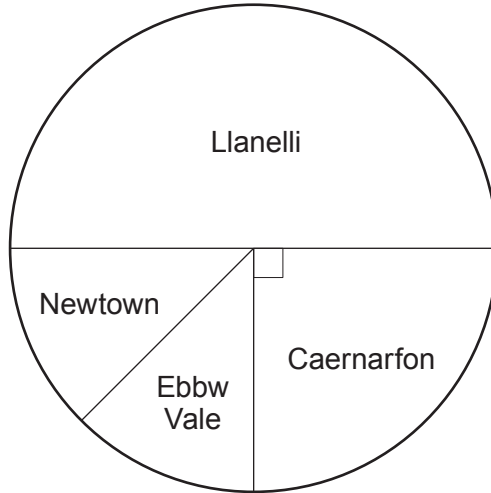What is the probability that a 3 is thrown on both occasions? [2]

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(b) A company has offices in Llanelli, Caernarfon, Newtown and Ebbw Vale.
Its national committee is made up of workers from these four offices.

The pie chart below shows what fraction of the committee members come from each office.

There is an equal number of members from Newtown and Ebbw Vale.

A member is chosen at random from this committee to be its chairperson.

(i) The probability that the chosen member works at the Llanelli office is shown in the table below.

Complete the table. [2]

Office	Llanelli	Caernarfon	Newtown	Ebbw Vale
Probability	$\frac{1}{2}$			

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(ii) What is the probability that the member chosen as chairperson works at either the Llanelli or the Ebbw Vale office?
You must show all your working. [2]

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14. *(a)* Calculate the value of $(2 \times 10^{-4}) \times (7{\cdot}8 \times 10^{9})$.
Give your answer in standard form. [2]

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(b) Calculate the value of $\dfrac{3{\cdot}9 \times 10^{8}}{3000}$.

Give your answer in standard form. [2]

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15. Factorise $12x^2 + 3xy$. [2]

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16. Calculate the size of angle x in the diagram below. [3]

Diagram not drawn to scale

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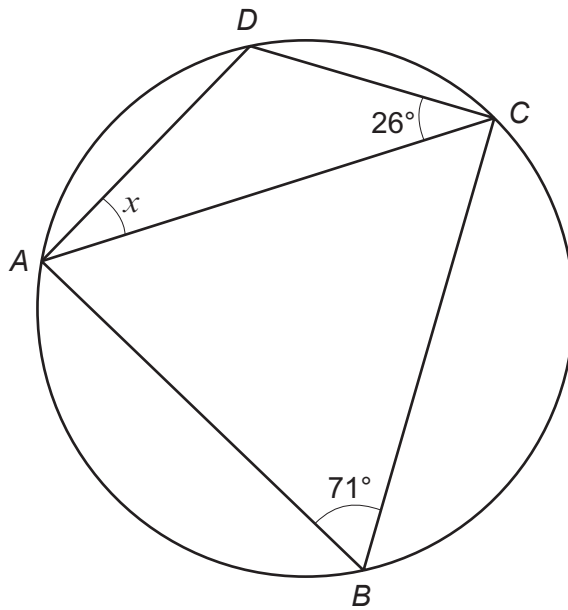
17. The line *AB* is drawn below.
The point *P* lies **above** the line *AB*.

The region in which *P* is located is such that

- *P* is nearer to point *A* than to point *B*,

- $B\hat{A}P \leqslant 60°$,

- $AP \geqslant 6\,\text{cm}$.

Using a ruler and a pair of compasses, **construct** suitable lines and arcs to represent these conditions.
Construction arcs must be clearly shown.

Shade the region in which the point *P* is located. [5]

A ——————————————————————————— *B*

18. In the triangle *ABC* shown below, $\stackrel{\frown}{BAC} = 40°$ and $\stackrel{\frown}{ACB} = 80°$.
X is a point on side *AC* such that *BX = BC*.
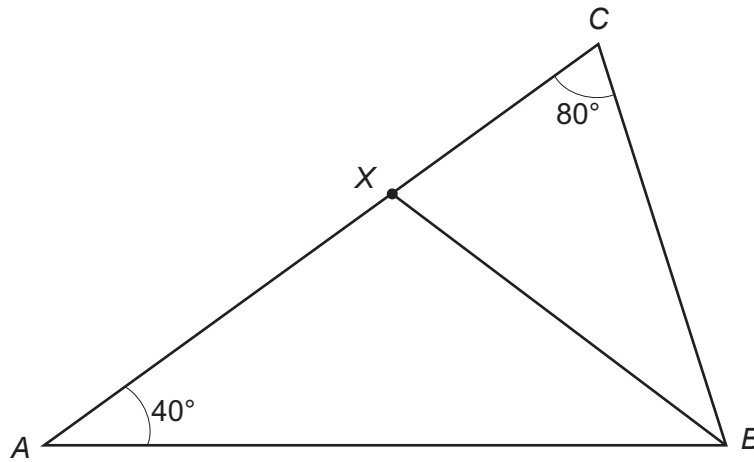
Diagram not drawn to scale

Prove that *AX = BX*.
Give reasons for each step of your proof.
You must show all your working.   [5]

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END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.	Examiner only

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