Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U10-1

A21-3300U10-1

MONDAY, 8 NOVEMBER 2021 – MORNING

MATHEMATICS
UNIT 1: NON-CALCULATOR
FOUNDATION TIER

1 hour 25 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.

A ruler, a 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 additional page at the back of the booklet. Question numbers must be given for all work written on the additional 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 **9**, 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.	**6**	
2.	**2**	
3.	**3**	
4.	**2**	
5.	**4**	
6.	**2**	
7.	**2**	
8.	**3**	
9.	**6**	
10.	**5**	
11.	**3**	
12.	**3**	
13.	**2**	
14.	**3**	
15.	**5**	
16.	**3**	
17.	**3**	
18.	**3**	
Total	**60**	

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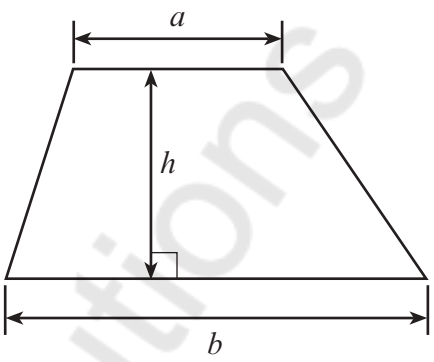
Formula List – Foundation Tier

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



Examiner only

1. *(a)* Write 95 048 in words. [1]

Ninety five thousand and forty eight

(b) Find the sum of 872 and 59. [1]

$$\begin{array}{r} {}^{1}8\,{}^{1}7\,2 \\ +\ 5\,9 \\ \hline 9\,3\,1 \end{array} \quad = 931$$

(c) Multiply 250 by 5. [1]

$$\begin{array}{r} {}^{2}2\,5\,0 \\ \times\ \ \ 5 \\ \hline 1250 \end{array} \quad = 1250$$

(d) Work out $\frac{1}{3}$ of 624. [1]

$\frac{1}{3} \times 624 = \frac{624}{3} = 208$

(e) Write down all the factors of 18. [2]

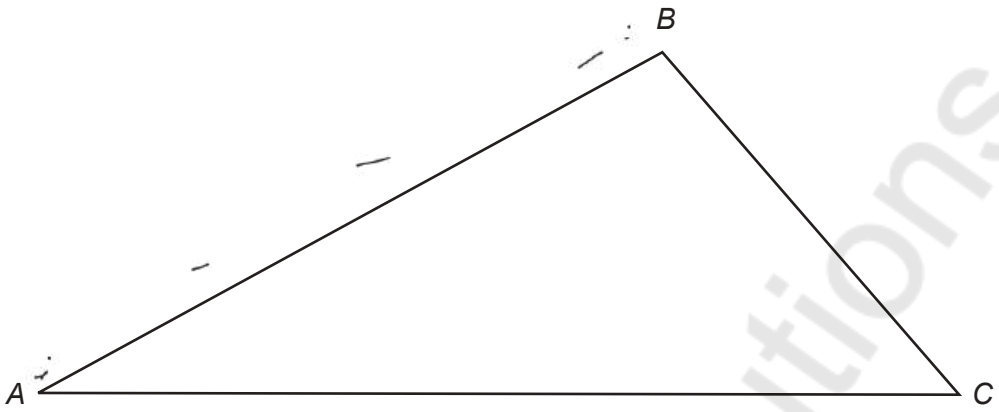
$\frac{18}{1} = 18$, $\frac{18}{2} = 9$, $\frac{18}{3} = 6$, $\frac{18}{6} = 3$, $\frac{18}{9} = 2$ $\frac{18}{18} = 1$

1, 2, 3, 6, 9, 18

The factors of 18 are 1, 2, 3, 6, 9, 18

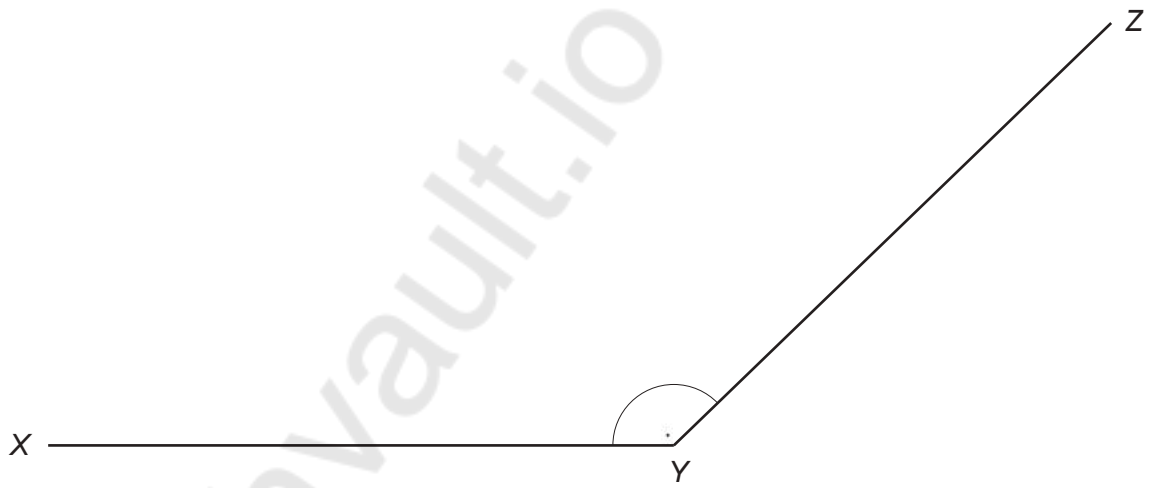
Examiner only

2. *(a)* Measure the length of the side *AB* of this triangle.
Write your answer in millimetres. [1]



AB = 94 mm

(b) Measure and write down the size of $X\hat{Y}Z$. [1]



$X\hat{Y}Z$ = 136° °

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3. *(a)* Which one of these numbers is both a square number **and** an even number? Circle the correct answer. [1]

2 9 12 16 17

Square numbers: $3 \times 3 = 9$, $4 \times 4 = 16$

even numbers: 2, 12, 16

(b) Write 75% as a fraction in its lowest terms. [1]

$\frac{75}{100} = \frac{75 \div 5}{100 \div 5} = \frac{15 \div 5}{20 \div 5} = \frac{3}{4}$

(c) Write down the mode of these numbers. [1]

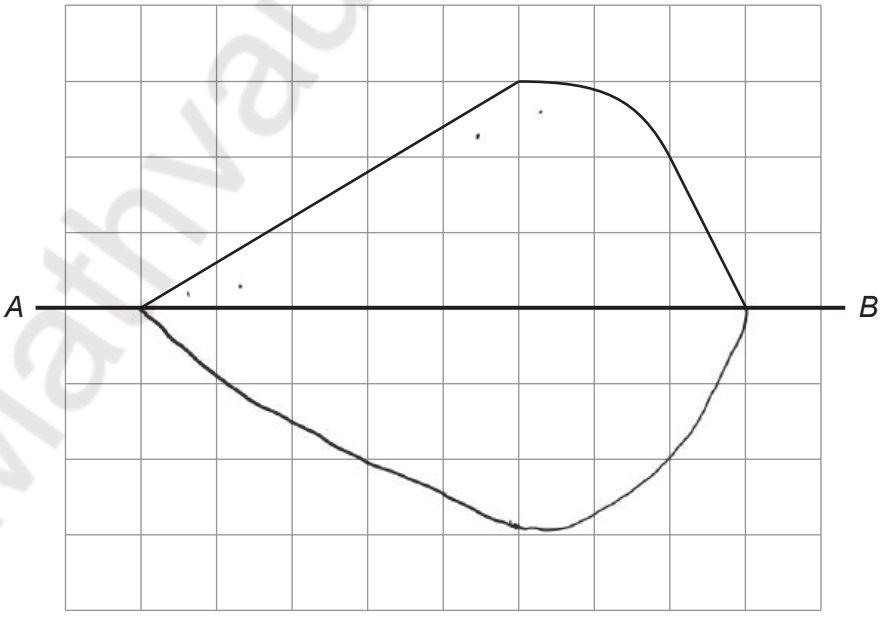
28 31 28 29 31 28 34 24 32

28 = 3 times, 31 = 2 times, all other numbers = One time

= 28

Mode is 28

4. Draw a reflection of this shape in the line *AB*. [2]



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5. *(a)* The mass of 1 litre of water is 1 kg.
What is the mass of 4·3 litres of water?
Write your answer in grams. [2]

1L = 1kg 4·3L = 4·3kg

1kg = 1000 grams 4·3 × 1000 = 4300g

Mass = 4300 g

(b) A rope is 3 m long.
It is cut into 6 equal pieces.

What is the length of each piece of rope?
Write your answer in centimetres. [2]

Rope = 3m cut into 6 equal pieces

$\frac{3}{6}$ = 0·5m 1 metre = 100 cm

0·5 × 100 = 50 cm

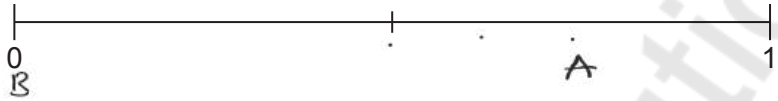
Length = 50 cm

Examiner only

6. Meic has a bag of 20 coloured balls.
14 of the balls are yellow, 4 are blue and the rest are red.
Meic chooses a ball at random from his bag.

On the probability scale below, mark the points **A** and **B** where:

- **A** is the probability of Meic choosing a yellow ball,
- **B** is the probability of Meic choosing a green ball. [2]



A = P(yellow balls) = $\frac{14^{7}}{20_{10}} = \frac{7}{10} = 0.7$

B = P(Green balls) = $\frac{0}{20} = 0$

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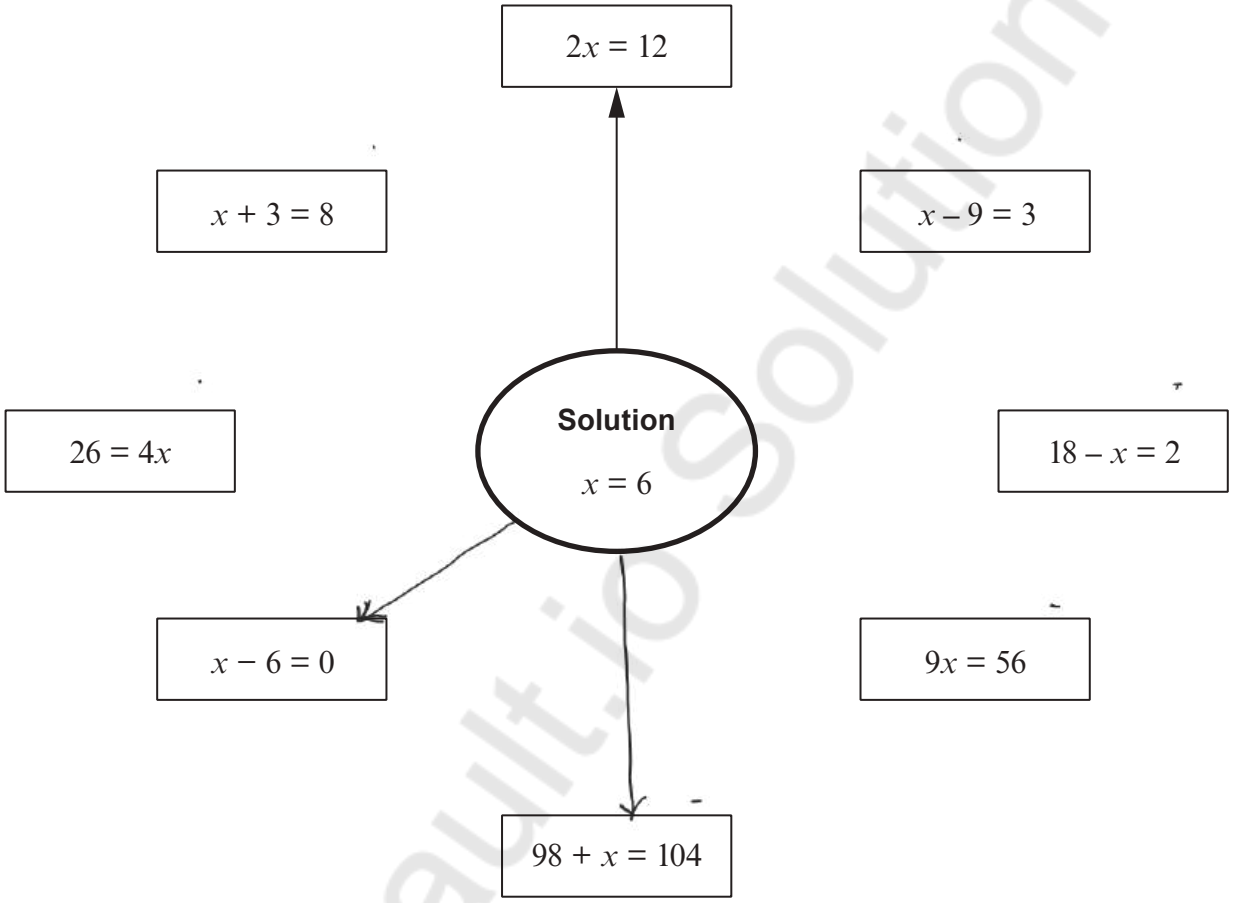
7. The solution to three of the following equations is $x = 6$.

For example, the solution to the equation $2x = 12$ is $x = 6$.
The solution has already been matched to this equation with an arrow.

Match the solution, $x = 6$, to the **other two equations** for which it is the correct solution. [2]



Space for working:

$x = 6$. $x - 9 = 3$ where x is 6 ; $6 - 9 = -3$

$18 - x = 2$; $18 - 6 = 12$ $9x = 56$; $9(6) = 54$

$98 + x = 104$; $98 + 6 = 104$ ✓ $x - 6 = 0$, $6 - 6 = 0$ ✓

$26 = 4x$; $4(6) = 24$

$x + 3 = 8$; $6 + 3 = 9$

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8.

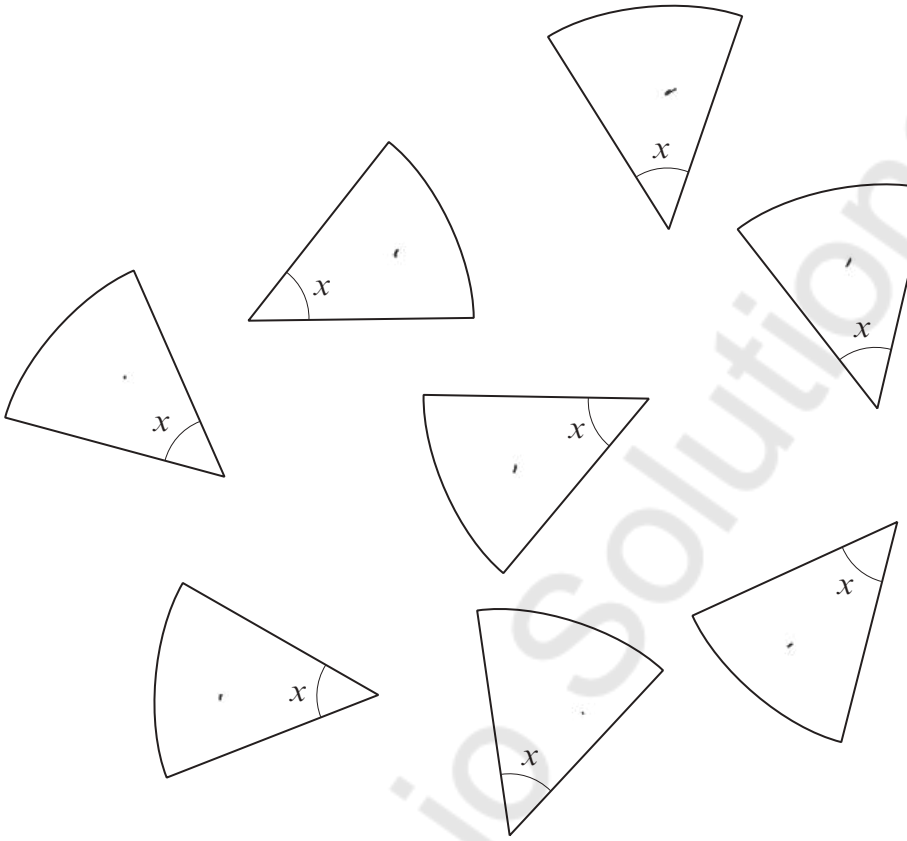

Diagram not drawn to scale

Eight identical sectors of a circle fit together to make a complete circle.
Calculate the value of x. [3]

Total angle of a circle is 360°

So $x = \frac{360}{8} = 45°$

$x =$ 45 °

Examiner only

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

A rectangle has length 15 cm and width 7 cm.
A square has the same perimeter as this rectangle.

Calculate the length of a side of the square.
You must show all your working. [4 + 2 OCW]

Find the Perimeter of the rectangle: $2 \times (\text{length} + \text{width})$

Length = 15 cm Width = 7 cm

$P = 2(15 + 7) = 2 \times 22 = 44\text{cm}$

$\frac{44}{4} = 11\text{cm}$

Examiner only

10. *(a)* Calculate the size of angle x in the right-angled triangle shown below. [2]

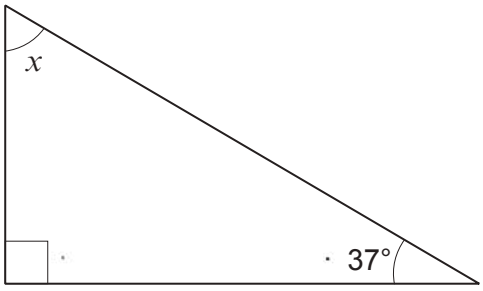

Diagram not drawn to scale

$x + 90 + 37 = 180$

$x = 180 - 90 - 37$

$x = 53$

(b) *ABCD* is a quadrilateral.
BE is a straight line.
Calculate the size of angles a and b. [3]

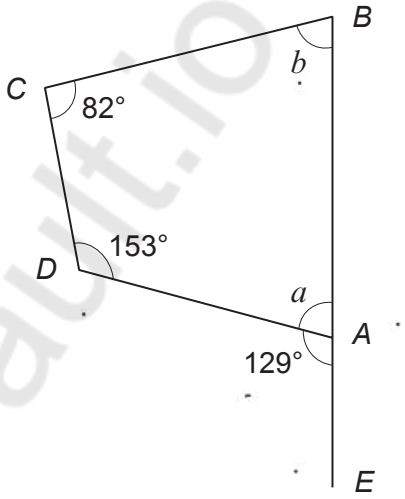

Diagram not drawn to scale

$\angle C = 82^\circ$ $\angle D = 153^\circ$ $\angle EAD = 129^\circ$

angle a = $180 - 129 = 51$

angle b = 360 $\angle a + \angle b + \angle C + \angle D = 360$

$51 + b + 82 + 153 = 360$; $b = 360 - (82 + 153 + 51)$

$b = 360 - 286 = 74^\circ$

$a =$ 51 ° $b =$ 74 °

Examiner only

11. Circle the correct answer to complete each of the following statements.

(a) $\frac{1}{3}$ of $\frac{1}{3}$ is equal to [1]

$\frac{2}{3}$ $\frac{2}{6}$ $\frac{1}{6}$ $\frac{1}{9}$ $\frac{2}{9}$

$\frac{1}{3} \times \frac{1}{3} = \frac{1 \times 1}{3 \times 3} = \frac{1}{9}$

(b) $0{\cdot}02 \times 0{\cdot}8$ is equal to [1]

0·016 0·16 1·6 0·4 4

$0{\cdot}02 \times 0{\cdot}8$. Ignore decimals: $2 \times 8 = 16 = 0{\cdot}016$

(c) 1·5% can be written as [1]

$1{\cdot}5^{100}$ 0·15 0·015 0·105 $1{\cdot}5^{10}$

$\frac{1{\cdot}5}{100} = \frac{15^{3}}{1000_{200}} = \frac{3}{200} = 0{\cdot}015$

12. *(a)* Calculate the value of $\frac{2}{5} \times \frac{1}{4}$.

Give your answer in its simplest form. [1]

$\frac{2}{5} \times \frac{1}{4} = \frac{2 \times 1}{5 \times 4} = \frac{2 \cdot 1}{\cancel{20}\ 10} = \frac{1}{10}$

(b) Calculate the value of $3^3 \div 2^2$.
Give your answer as a decimal. [2]

$3^3 \div 2^2$, $3^3 = 3 \times 3 \times 3 = 27$

$2^2 = 2 \times 2 = 4$

$\frac{27}{4} = 6{\cdot}75$

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13. A cuboid measures 5 cm by 3 cm by 2 cm.

Calculate the volume of the cuboid.
Give your answer in cm^3. [2]

Length = 5
Width = 3
Height = 2

Volume of a cuboid = L × W × H

$5 \times 3 \times 2 = 30\ cm^3$

Volume = 30 cm^3

14. A number n is added to the square root of 81.
The answer is equal to 7 squared.

What is the value of n? [3]

$n + \sqrt{81} = 7^2$ $7^2 = 49$

$n + 9 = 49$

$n = 49 - 9$

$n = 40$

$n =$ .....

Examiner only

15. Some letters are made using only straight lines e.g. T.
Some letters are made using straight lines and curved lines e.g. P.
Some letters are made using only curved lines e.g. S.

Six cards spell out the name BANGOR.

In a game, the six cards are placed in a bag.
One card is chosen at random.
The letter on the card is noted and the card is returned to the bag.

If the card has a letter on it that is made using only straight lines, the player gains 10 points.
A card with any other type of letter gains no points.

Leah plays the game 24 times.

Do you expect Leah to score a total of 100 points?
You must show all your working. [5]

BANGOR Straight lines only = A & N

P(straight lines) = 6 cards ; 2 cards with straight lines only

$\frac{2}{6}^{1} = \frac{1}{3}$

$\frac{1}{3}_{1} \times 24^{8} = 8$

Expected total points:

$8 \times 10 = 80$ points

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16. *AB* and *CD* are parallel.

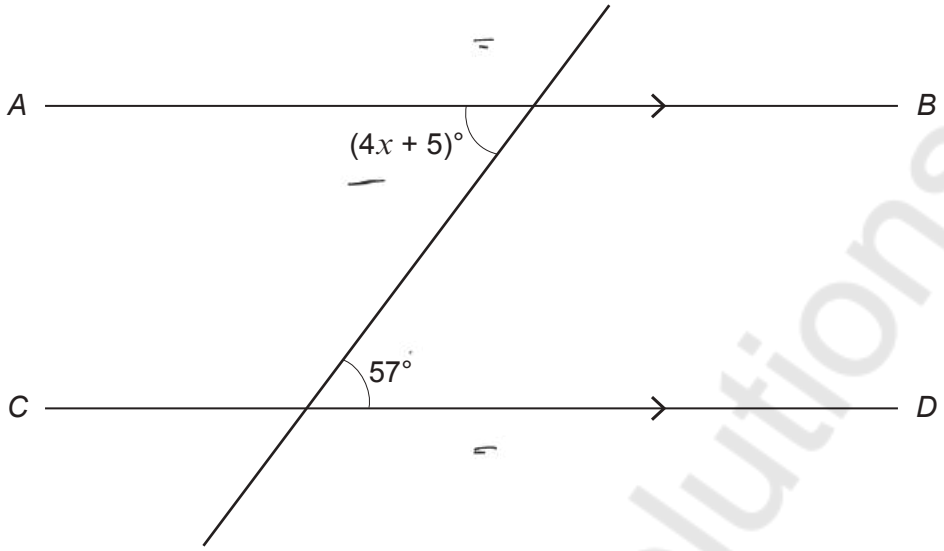

Diagram not drawn to scale

Calculate the value of x. [3]

$(4x + 5)^\circ = 57^\circ$

$4x = 57 - 5$

$\frac{4x}{4} = \frac{52}{4}$ $\quad x = 13$

17. Write down four positive whole numbers in the boxes below so that:

- the range of the numbers is 6,
- the mean of the numbers is 5,
- the median of the numbers is 4.

[3]

Range = 6, mean = 5, median 4

$d - a = 6$

Range = Largest − smallest = 6

$\bar{a}, b, c, \bar{d}$

$\text{mean} = \frac{a+b+c+d}{4} \times \frac{5}{1}$; $\frac{b+c}{2} \times \frac{4}{1}$

$b + c = 8$

$d - a = 6 \Rightarrow d = a + 6$, $b + c = 8$

$a + (b + c) + d = 20$; $a + 8 + (a + 6) = 20$

$2a + 14 = 20$; $2a = 20 - 14 = 6$

$\frac{2a}{2} = \frac{6}{2}$, $a = 3$

$d = a + 6$, $3 + 6 = 9$, $d = 9$

$b = 5$, $3 + 5 = 8$, $c = 3$, $5 = 4$, $4 + 4 = 8$, $c = 4$

= 3, 3, 5, 9

3, 4, 4, 9

3	3	5	9

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18. A car travels 100 miles in 2 hours and 30 minutes.
Calculate its average speed in miles per hour. [3]

2hours, 30 mins $2 + \frac{30}{60} = 2.5$ hours

Speed = $\frac{\text{distance}}{\text{time}} = \frac{100}{2.5} = 40$ miles per hour

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