Name	Date started	Target end date

WJEC GCSE Mathematics and Numeracy (Double Award) — Question Pack

Foundation place value, rounding and directed numbers: reading and writing whole numbers and decimals by column value, rounding to the nearest 10, 100

REVISE
.wales

F2.01 — Place value, rounding & directed numbers

Spec 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.8, 1.1.9 — Unit 2 (no calculator)

Foundation place value, rounding and directed numbers: reading and writing whole numbers and decimals by column value, rounding to the nearest 10, 100 or 1000 (and to decimal places), ordering negative and positive numbers, and the rules for adding and subtracting with directed numbers. Sourced from legacy WJEC GCSE Mathematics-Numeracy Foundation papers (3300U10/U20) and accessible content from Intermediate papers (3300U30/U40), organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~1 hours 36 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (64 marks across 72 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification.

Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

*A calculator is **not** permitted on any question in this pack (Unit 2 is the non-calculator paper).*

Place value, rounding & directed numbers — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 2: non-calculator.

Place value & ordering 1.1.1

- Identify the value of each digit in a whole or decimal number.
- Compare and order numbers including negatives.
- Use a number line for negative integers.

Rounding 1.1.4

- Round to the nearest 10, 100 or 1000.
- Round to a given number of decimal places.
- Check rounded answers are sensible.

Directed numbers 1.1.5

- Add and subtract positive and negative integers.
- Apply − × − = + when multiplying directed numbers.
- Use directed numbers in temperature, height, banking contexts.

Exam strategy 1.1

- Non-calculator paper — show all working.
- Sketch a number line for tricky negative comparisons.
- Re-read the rounding instruction (10? 100? 1 dp?).

Crib sheet »

Place value, rounding & directed numbers in one page

Quick-reference notes — revisit before each question. Don't use during the questions.

Place value

Each column is 10× the one to its right: thousands, hundreds, tens, ones · tenths, hundredths.

352 ⇒ the 5 means **5 tens = 50**.

Rounding to nearest 10/100/1000

Look at the digit *just to the right* of the rounding column.

5 or more ⇒ round up. 4 or less ⇒ round down.

2,847 to nearest 100 = 2,800.

Rounding decimals

to 1 dp: keep 1 digit after the point

3.46 → 3.5 (1 dp). 3.44 → 3.4.

Ordering negatives

On a number line, the further **left**, the smaller.

−3 < −1 < 0 < 2. Bigger digit doesn't mean bigger number when negative.

Adding/subtracting negatives

$$a - (-b) = a + b$$

Subtracting a negative = adding a positive.

5 − (−3) = 8.

Common traps

- Writing 3.4 when 3.40 is needed for money.
- Saying −5 > −3 (wrong — −5 is smaller).
- Forgetting the sign change when subtracting a negative.

Examiner only

1. *(a)* Write the number fifty thousand and four in figures. [1]

.....

(b) Calculate £7.20 divided by 9.

Write your answer in pence. [2]

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Answer: ..... pence

(c) Mair thought of two whole numbers.
When she multiplied them together, the answer was 20.
When she added them together, the answer was 9.
What are the two numbers that Mair thought of? [2]

.....

.....

.....

Numbers are ..... and .....

Examiner only

(c) Draw the line $y = -3$ on the graph paper.

Write down the values of x where the line $y = -3$ cuts the curve $y = x^2 - 5x + 2$.
Give your answers correct to 1 decimal place. [2]

Values of x are ..... and .....

12. (a) Express 700 as a product of its prime factors in index form. [3]

(b) The number 33 554 432 is equal to 2^{25}.

Explain how this tells you that 33 554 432 is not a square number. [1]

Examiner only

18. Calculate the value of $(5{\cdot}41 \times 10^5) + (2{\cdot}3 \times 10^4)$.
Give your answer in standard form. [2]

19. Rashid owned n sheep.
Eifion had exactly 4 times as many sheep as Rashid.

Rashid buys 17 extra sheep.
Eifion sells 8 of his sheep.

Eifion still has more sheep than Rashid.

Form an inequality, in terms of n.
Solve the inequality to find the **least** value of n.
You must show all your working. [5]

END OF PAPER

Examiner only

20. *ABCF* is a rectangle.
CDEF is a trapezium.
BD is a straight line.

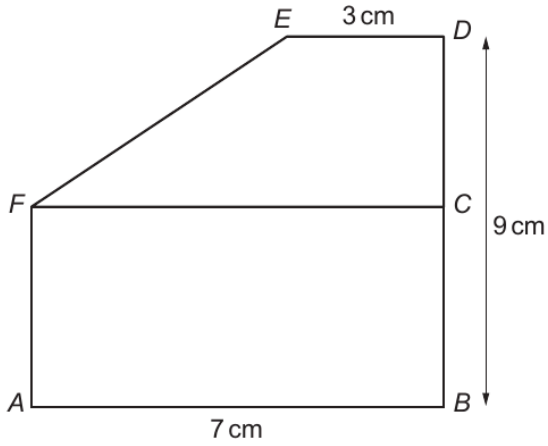


Diagram not drawn to scale

AB = 7 cm, *BD* = 9 cm and *DE* = 3 cm.

The perimeter of rectangle *ABCF* is 24 cm.

Calculate the **area** of the trapezium *CDEF*.
You must show all your working. [4]

END OF PAPER

Examiner only

1. Fill in the boxes below to make each calculation correct. [4]

£3.26	+	89p	=	£ .....
78p	+	£	=	£5.45
7	×	46p	=	£ .....
.....	×	25p	=	£9.75

2. *(a)* Write 2453 correct to the nearest 10. [1]

.....

(b) Write in figures the number that is one less than ten thousand. [1]

.....

Examiner only

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

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

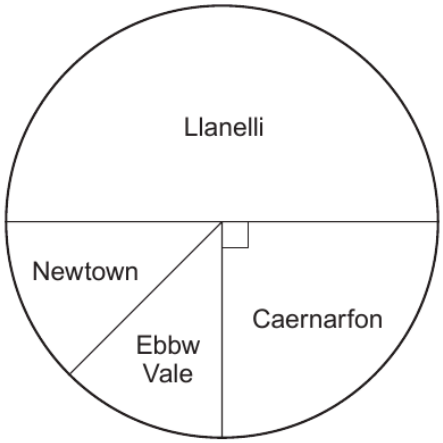
(b) Solve $\frac{22 - f}{3} = 6$. [3]

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

Examiner only

(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	$\frac{1}{2}$			

.....

.....

.....

(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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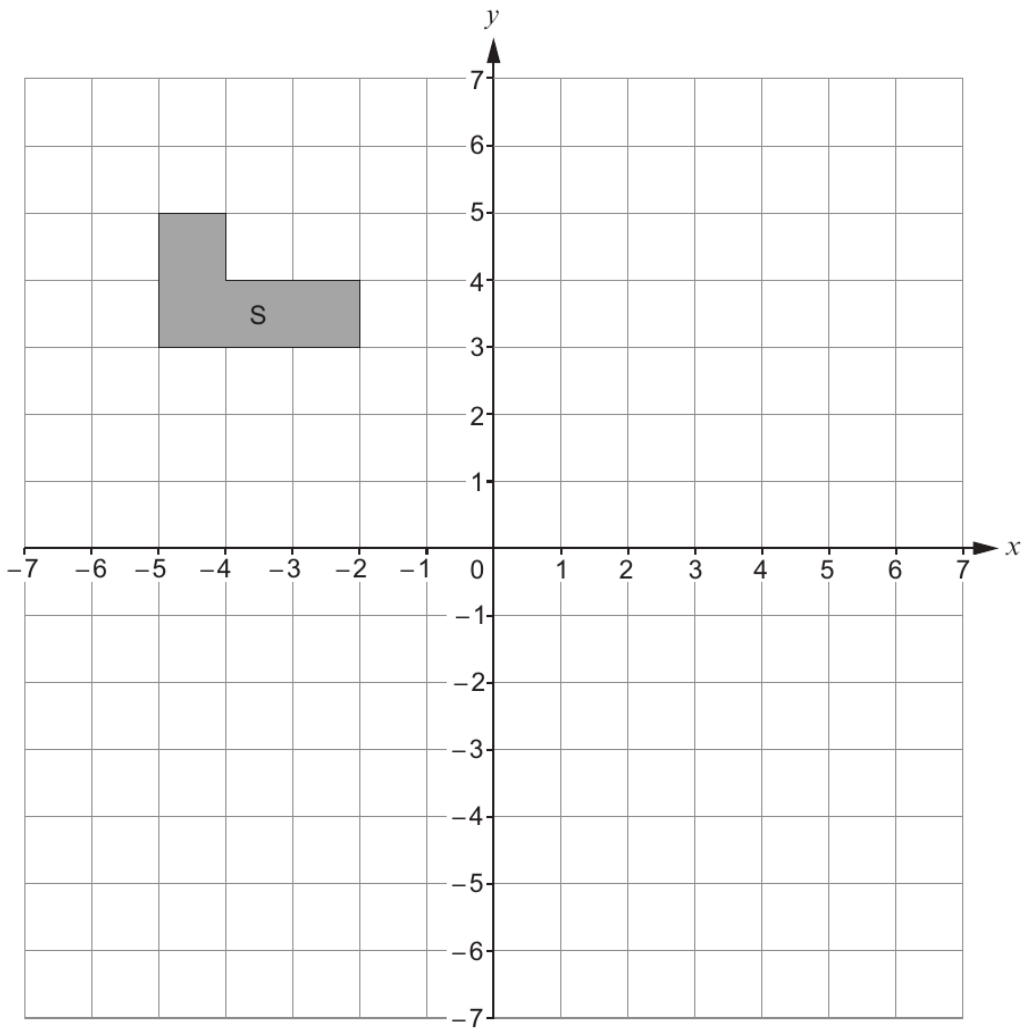
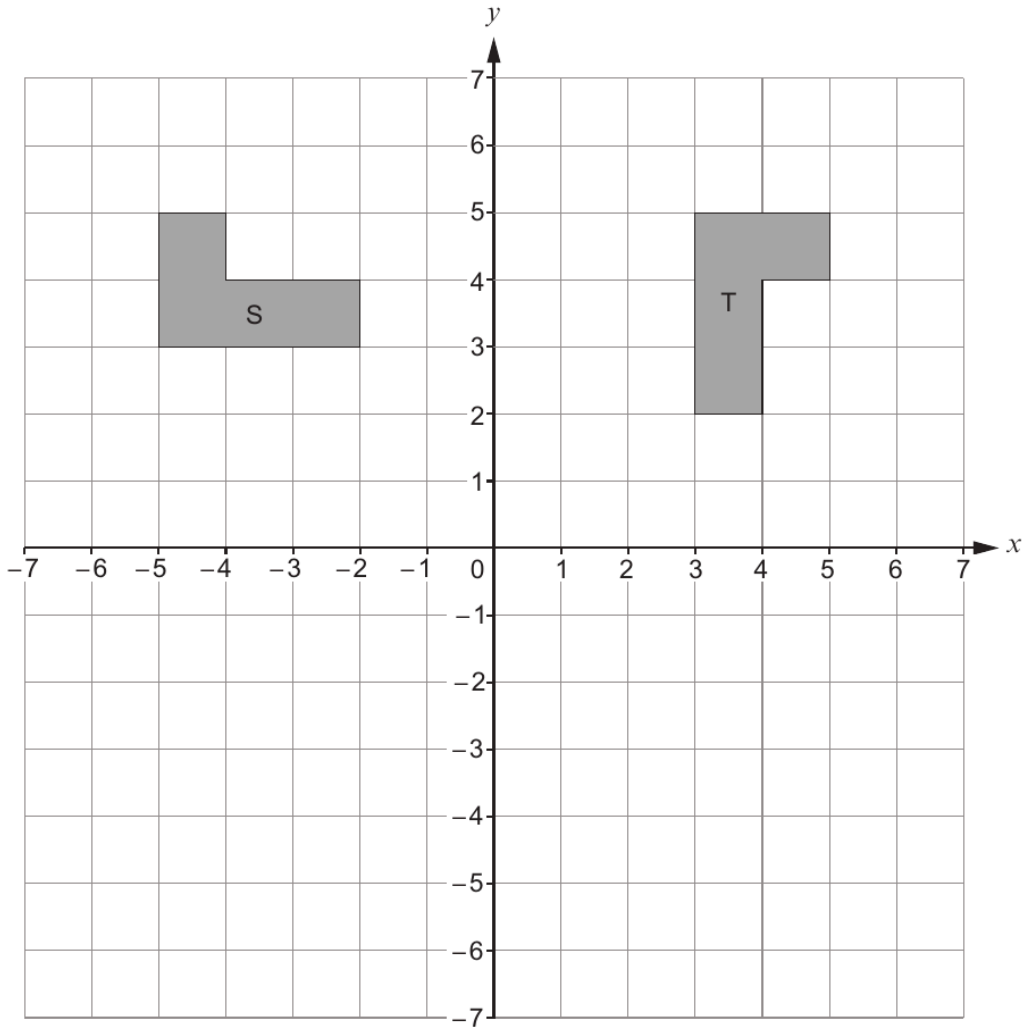
Examiner only

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



Examiner only

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



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END OF PAPER

Examiner only

2. *(a)* Write thirteen point two five in figures. [1]

.....

(b) Write the number 60 043 in words. [1]

.....

(c) Here are four digits:

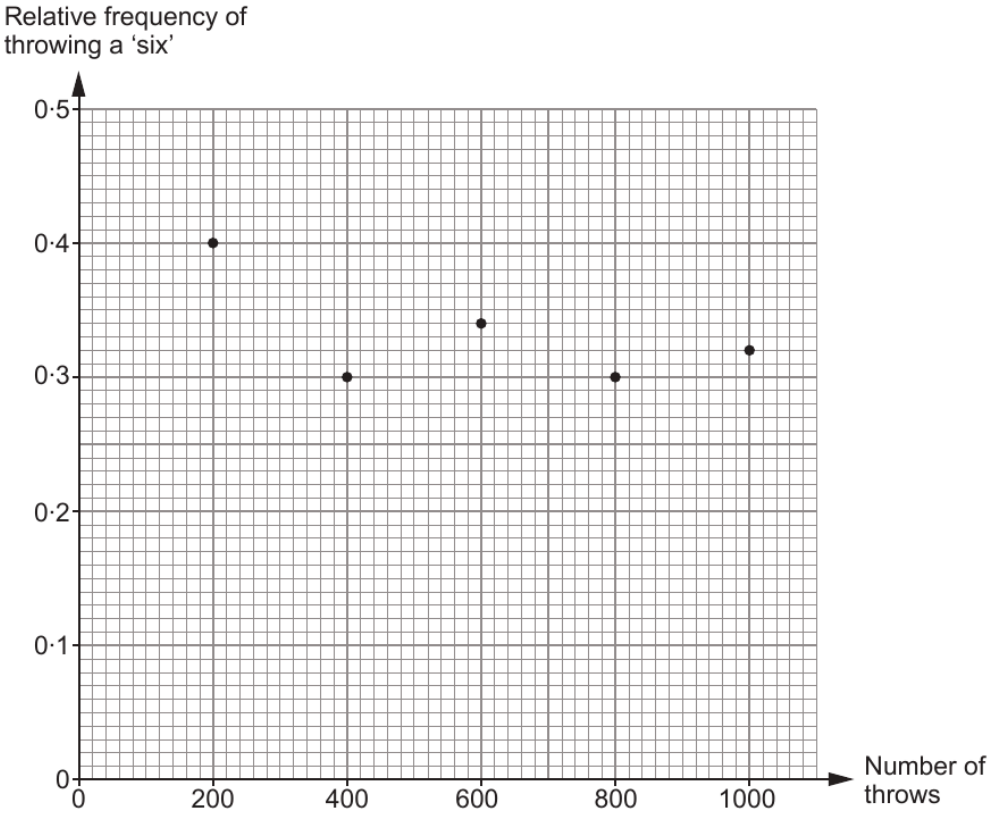
8 5 3 7

(i) Use each of these digits once and once only.
What is the **largest** number that can be made? [1]

(ii) Use **three** of these digits once and once only.
What is the **smallest even** number that can be made? [1]

Examiner only

17. A biased six-sided dice is thrown a total of 1000 times.
The graph shows the relative frequency of throwing a 'six' after 200, 400, 600, 800 and 1000 throws.



(a) Which of the following is the best estimate for the probability of throwing a 'six' with this dice?
Circle your answer. [1]

0·4 0·3 0·5 0·32 0·34

(b) (i) How many 'sixes' were thrown in the first 600 throws of the dice? [2]

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.....

(ii) How many **more** 'sixes' were recorded for these 600 throws than you would expect when a **fair** six-sided dice is thrown 600 times? [2]

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Examiner only

17. *ABCE* is a square.

Calculate the area of the shape *ABCDE* shown below. [5]

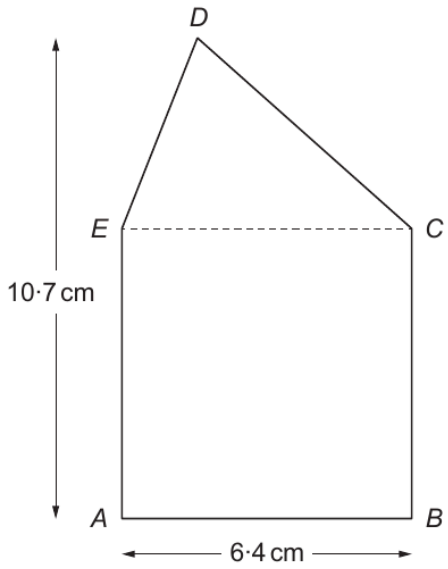


Diagram not drawn to scale

Examiner only

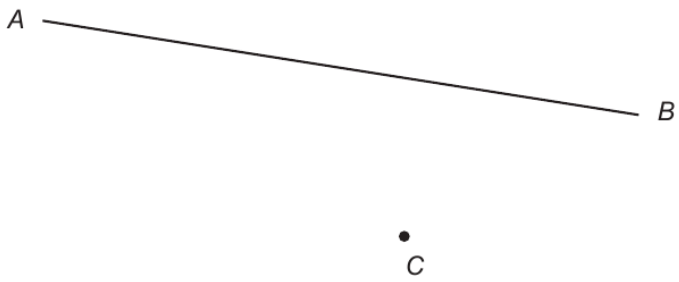
18. A cuboid has sides x cm, 5 cm and 7 cm.
The total surface area of the cuboid is 142 cm^2.

Form an equation in terms of x.
Solve the equation to find x. [4]

END OF PAPER

Examiner only

4. A line *AB* is shown below.



(a) Mark the midpoint of *AB* with a ×. [1]

(b) Draw a line parallel to *AB* that passes through point *C*. [1]

5. *(a)* Bethan writes down two square numbers.

She adds her two numbers together.
Her answer is a square number less than 30.

Which two square numbers did Bethan write down? [2]

Bethan's square numbers are ..... and .....

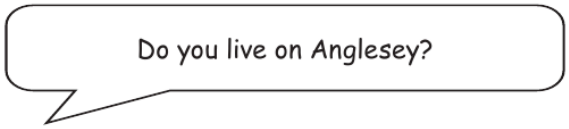
(b) Harri adds three even numbers together and gets an answer of 23.

Explain how you know that Harri's answer is incorrect. [1]

Examiner only

15. The Anglesey Show is a two-day event held every August.

(a) On the first day, a random sample of 2000 visitors at the show were asked:



640 of them answered 'Yes'.

What was the relative frequency of those who answered 'Yes'?
Give your answer as a decimal. [1]

(b) On the second day a random sample of 3000 visitors at the show were asked the same question.
The relative frequency of those who answered 'Yes' on this day was 0·42.

Calculate the relative frequency of those who said they lived on Anglesey when the samples for **both** days were combined.
Give your answer as a decimal. [4]

(c) Which of the following is most likely to give the best estimate for the relative frequency of visitors to the show living on Anglesey?
Circle your answer.

Your answer to part *(a)*	0·42	Your answer to part *(b)*

You **must** give an explanation for your choice. [1]

Examiner only

17. Arthur, Sian and Kezia are all given some £1 coins.

Arthur receives £n.
Sian is given five times as much money as Arthur.
Kezia receives three times as much money as Arthur, plus an extra £7.

Sian was given less money than Kezia.

(a) Write down an inequality in terms of n that illustrates the fact that Sian received less money than Kezia. [2]

(b) What was the greatest amount of money that Arthur could have been given? [2]

Examiner only

1. Complete each row of the following table.
The first row has been completed for you. [3]

Place	Temperature at 10 a.m.	Change	Temperature at 6 p.m.
Cwmbran	2°C	Down 4°C	−2°C
Llanelli	−3°C	Down 1°C	
Llanidloes	−4°C		−1°C
Porthmadog		Up 4°C	3°C

2. Write 7%, $\frac{3}{5}$ and 0·3 in ascending order.

You must show all your working. [3]

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Smallest value ⟶ Greatest value

Examiner only

(b) The object is made from a material which has a density of 2·4 g/cm^3.
Calculate the mass of the object.
Give your answer in kg, correct to the nearest kg. [3]

Mass = ... kg

17. The equation of a straight line is $y = 8x - 5$.
What is the gradient of the line?

Circle the correct answer. [1]

$\frac{1}{8}$ -5 8 5 1

Examiner only

20. A cuboid has dimensions of 40 mm, 25 mm and 12 mm.
All of these measurements are correct to the nearest mm.

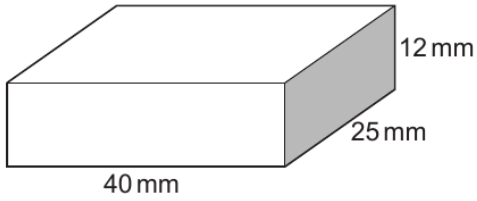

Diagram not drawn to scale

Four of these cuboids are stacked together as shown below.

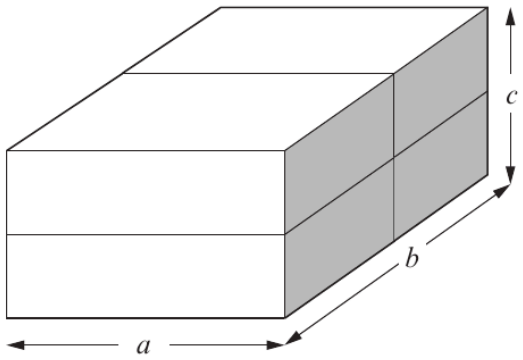

Diagram not drawn to scale

(a) Write down the **greatest** possible value of length a.
Give your answer in mm. [1]

.....

(b) Calculate the **greatest** possible value of length b.
Give your answer in mm. [1]

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.....

.....

(c) Calculate the **least** possible value of length c.
Give your answer in mm. [1]

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END OF PAPER

Examiner only

1. Fill in the boxes below to make each calculation correct. [4]

£1.63	+	35p	=	£ .....
£1.73	+	..... p	=	£2.26
7	×	84p	=	£ .....
17	×	£	=	£6.97

Space for working:

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Examiner only

7. *(a)* Calculate $\frac{\sqrt{0{\cdot}9216}}{8}$. [1]

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(b) Calculate $\frac{3}{5}$ of 632.

Write your answer as a decimal. [2]

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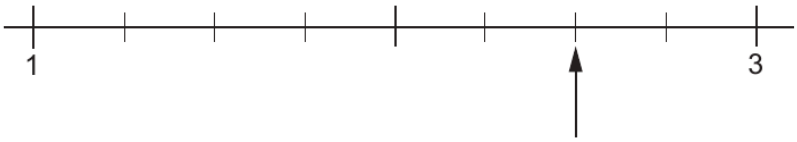
(c) A number line is shown below.
To which number is the arrow pointing? [1]



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8. Complete the table below so that each row will show equivalent fractions, decimals and percentages.
The first row has been completed for you. [4]

Fraction	Decimal	Percentage
$\frac{1}{4}$	0·25	25 %
.....	0·3	..... %
$\frac{.....}{20}$	.....	45 %

Examiner only

17. In the diagram below, *ABCD* is a rectangle with *AB* = 5 cm.
ABP is a quarter of a circle with centre *A*.
AP = *PD*.

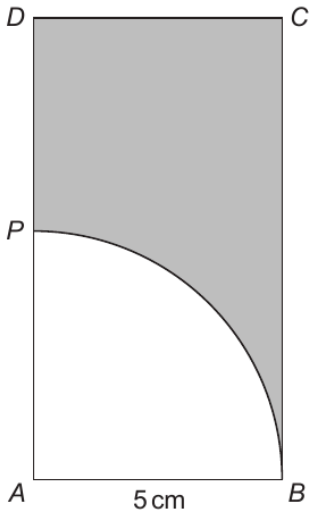


Diagram not drawn to scale

Calculate the area of the shaded section shown above.
You must show all your working. [5]

END OF PAPER

Examiner only

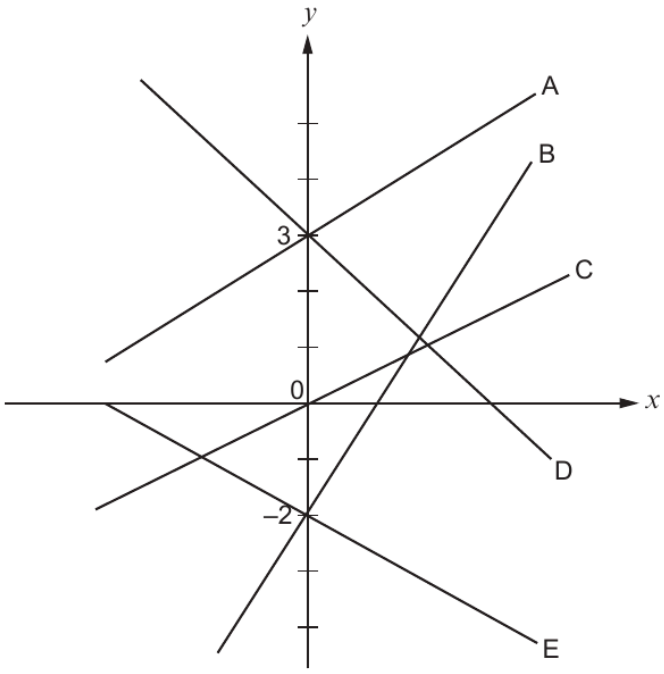
19. *(a)* Which one of the following equations represents a straight line that is parallel to the line $2y = 5x - 4$?
Circle your answer. [1]

$y = 2{\cdot}5x + 3$ $y = 5x - 2$ $y = 0{\cdot}4x - 4$ $y = -0{\cdot}4x - 2$ $2y = -5x + 4$

(b) Which one of the following equations represents a straight line that intersects the line $y = 7x - 5$ on the y-axis?
Circle your answer. [1]

$y = 7x + 5$ $y = 5 - 7x$ $y = 3x + 5$ $y = 0$ $y = 3x - 5$

(c)



Which one of the five straight lines shown above could represent the equation $y = -2x + 3$?
Circle your answer. [1]

Line A Line B Line C Line D Line E

END OF PAPER

Examiner only

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

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

(c) Multiply 250 by 5. [1]

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

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

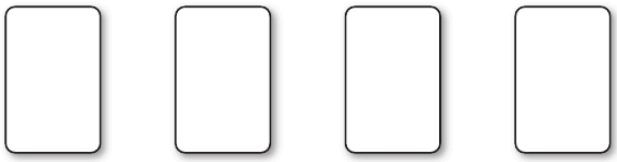
The factors of 18 are .....

Examiner only

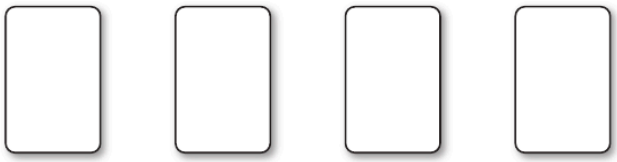
2. A card is chosen at random from a set of four cards.

In each question, **write numbers on the four cards** to make each of the following statements true.

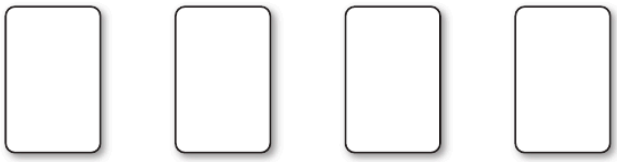
(a) It is certain that the chosen card will be a 5. [1]



(b) It is an even chance that the chosen card will be a 3. [1]



(c) It is unlikely that the chosen card will be a 2. [1]



3. *(a)* Write forty thousand and sixty-five in figures. [1]

.....

(b) Round 5378 to the nearest hundred. [1]

.....

Examiner only

14. *(a)* Rearrange the following formula to make k the subject.

$$p = 3k + 2$$ [2]

(b) Does the midpoint of the straight line joining points (3, 15) and (7, 19) lie on the line $y = 3x + 2$?
You must show all your working. [3]

15. *(a)* Express 0·0058 in standard form. [1]

(b) Calculate the value of $\dfrac{1{\cdot}4 \times 10^9}{2 \times 10^3}$.
Give your answer in standard form. [2]

Examiner only

17. Geraint is running a game in a school fair.
A large number of balls are placed in a box.
Each of the balls is one of three colours: bronze, silver or gold.

In the game, a ball is chosen at random from the box.
The table below shows the probability of choosing a bronze ball and the probability of choosing a silver ball.

Colour	Bronze	Silver	Gold
Probability	0·68	0·22	

In the game, each person pays £2 to choose a ball at random from the box.
The ball is then returned to the box.

The person wins £3 if a silver ball is chosen.
The person wins £8 if a gold ball is chosen.
There is no prize for choosing a bronze ball.

100 people each play the game once.

How much profit would you expect Geraint to make?
You must show all your working. [5]

Examiner only

17. Factorise $x^2 - 4x - 12$, and hence solve $x^2 - 4x - 12 = 0$. [3]

END OF PAPER

Examiner only

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

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END OF PAPER

Examiner only

5. (a) Elaine writes down two square numbers.

She subtracts the smaller square number from the larger square number.
Her answer is 9.

Which two square numbers did Elaine write down? [2]

.....

.....

.....

Elaine's square numbers are ..... and .....

(b) Dylan adds two odd numbers together and gets an answer of 37.

Could Dylan's answer be correct?

Yes ☐ No ☐ Can't tell ☐

Explain your reasoning. [1]

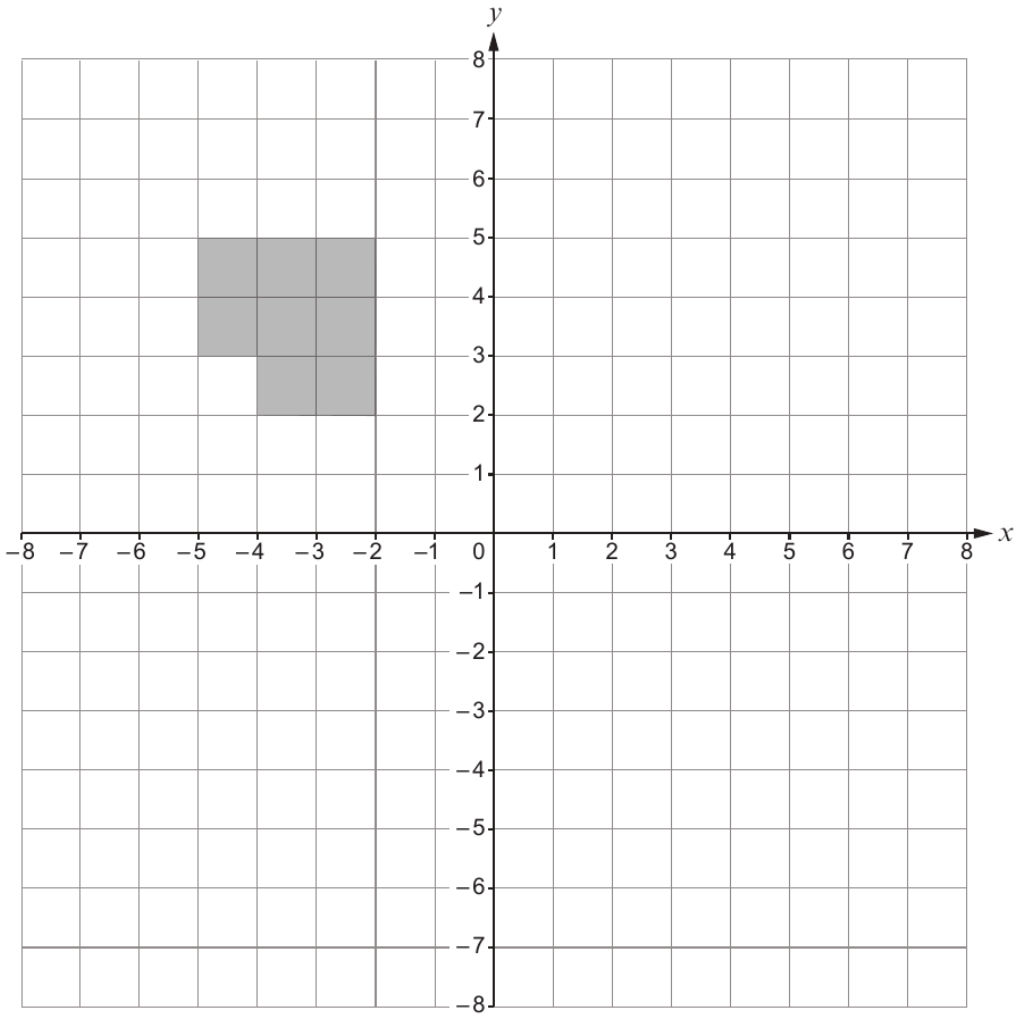
Reasoning: .....

.....

.....

Examiner only

16. Reflect the shape below in the line $x = 1$. [2]



17. A car travels 129·5 miles in 3 hours 30 minutes.
Calculate the average speed of the car.
Give your answer in miles per hour. [3]

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Examiner only

19. Write down four whole numbers so that:

- they are all between 1 and 15 inclusive
- they have a mode of 7
- they have a median value of 8·5
- their mean is 9.

Write your numbers in the boxes below. [3]

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END OF PAPER

Examiner only

2.

The table below shows the number of visitors to some of the top attractions in Wales in 2017 and 2018.
The table also shows the percentage change in the number of visitors from 2017 to 2018.

Attraction	Number of visitors 2017	Number of visitors 2018	Percentage change
Folly Farm	480 000	455 428	–5·1%
Cardiff Castle	319 131	452 007	+41·6%
Bodnant Garden	255 949	260 153	+1·6%
Caernarfon Castle	204 675	205 009	+0·2%
Conwy Castle	221 652	201 961	–8·9%
Zip World Slate Caverns	190 000	195 000	+2·6%

Use the information in the table above to answer the following questions.

(a) Zip World Slate Caverns had 195 000 visitors in 2018.
Write this number in words. [1]

.....

.....

(b) Which attraction had the smallest percentage change from 2017 to 2018? [1]

.....

.....

(c) Calculate the total number of visitors to Bodnant Garden in 2017 and 2018. [2]

.....

.....

.....

Examiner only

(d) Calculate the difference between the number of visitors to Cardiff Castle in 2017 and the number of visitors to Cardiff Castle in 2018. [2]

(e) Ian looks at the data and says,

"In 2018, Folly Farm had about half a million visitors."

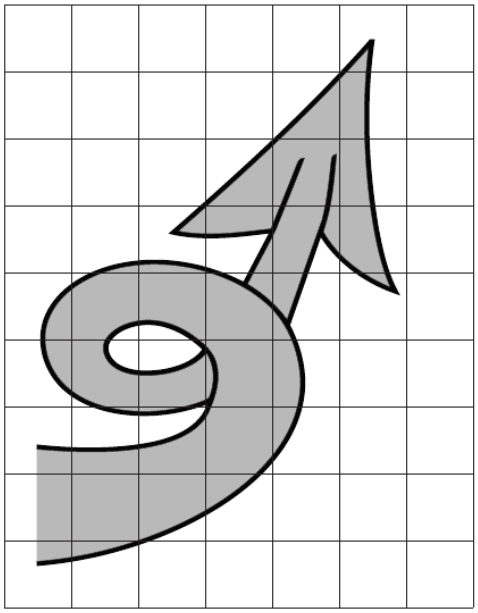
Is Ian correct?
Give a reason for your answer. [1]

Yes ☐ No ☐

Examiner only

(f) A new visitor attraction, Tailspin, wants to use the tail of the dragon from the Welsh flag as its logo.

The tail is drawn on the centimetre square grid below.
Each square on the grid represents an area of 4 cm^2.



Tailspin is planning to make flyers to advertise the attraction.
To print the flyers, the area of the tail must be less than 48 cm^2.

The manager of Tailspin thinks that the area of the tail is greater than 48 cm^2.

Decide whether or not the manager is correct.
You must show all your working. [3]

The manager is:

Correct ☐ Not correct ☐

Examiner only

2. (a) *In this part of the question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Iwan recorded his gas usage for a week.
His meter reading was 21 345 kWh at the start of the week.
His meter reading was 21 640 kWh at the end of the week.

Gas costs 7.2p per kWh.
VAT at 5% is payable on the cost of any gas used.

Calculate the total cost of Iwan's gas for the week.
You must show all your working. [5 + 2 OCW]

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Examiner only

(b) For the first 7 days of October, the mean daily outside temperature at midday where Iwan lives was 13·2°C.
The temperatures at midday for the next 2 days of October were 12·2°C and 12·4°C.

Calculate the total of the temperatures for the first 7 days.
Hence, calculate the mean midday temperature for the first 9 days of October.
You must show all your working. [4]

The mean midday temperature for the first 9 days of October was ..... °C

(c) The plan of the streets where Iwan lives is shown below.

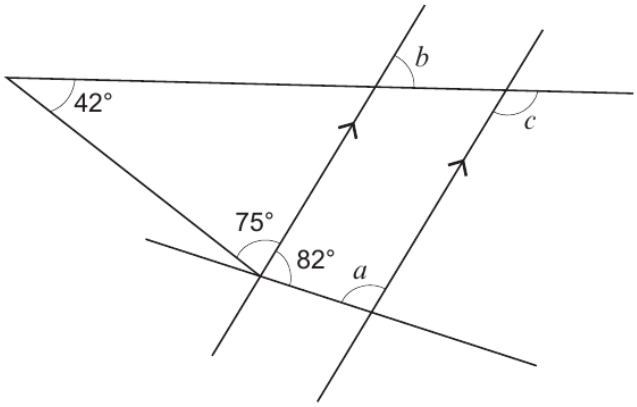

Diagram not drawn to scale

Find the size of each of the angles a, b and c. [3]

a = ... ° b = ... ° c = ... °

Examiner only

5. (a) Iwan recorded his gas usage for a week.
His meter reading was 21 345 kWh at the start of the week.
His meter reading was 21 640 kWh at the end of the week.

Gas costs 7.2p per kWh.
VAT at 5% is payable on the cost of any gas used.

Calculate the total cost of Iwan's gas for the week.
You must show all your working. [5]

Examiner only

(b) For the first 7 days of October, the mean daily outside temperature at midday where Iwan lives was 13·2°C.
The temperatures at midday for the next 2 days of October were 12·2°C and 12·4°C.

Calculate the total of the temperatures for the first 7 days.
Hence, calculate the mean midday temperature for the first 9 days of October.
You must show all your working. [4]

The mean midday temperature for the first 9 days of October was ..... °C

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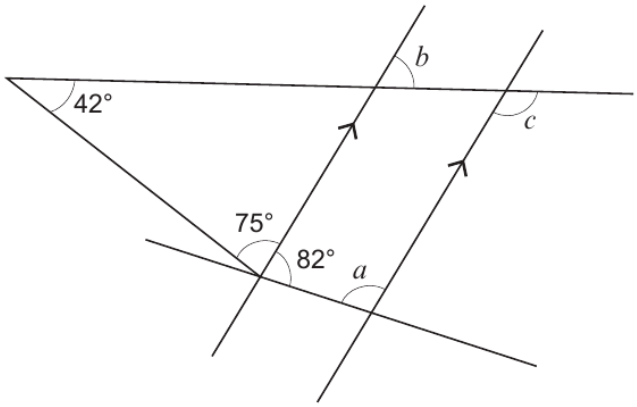

Diagram not drawn to scale

Find the size of each of the angles a, b and c. [3]

a = ... ° b = ... ° c = ... °

Examiner only

7. Lena flew from Havana Airport in Cuba to Gatwick Airport in the UK.
She then drove home from Gatwick Airport.

When it is 09:40 in Havana, it is 14:40 on the same day in Gatwick.

It took 9 hours 15 minutes to fly from Havana to Gatwick.
Lena's flight left Havana on Monday at 17:40 local Havana time.

On what day and at what time did this flight arrive in Gatwick?
Give your answer in UK time. [4]

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Day ..... Time .....

END OF PAPER

Examiner only

8. Melin is a company that packages flour for sale in supermarkets.
It packages the flour in cylindrical bags.
The area of the cross-section of each of these bags is $25\,cm^2$.

(a) Write down an expression, in terms of π, for **the radius of the base** of each of these bags. [2]

(b) Each bag has a volume of $500\,cm^3$.

(i) Currently the bags are filled with flour at a rate of $\frac{1}{4}$ of a bag per second.
Complete the following statement. [2]

Melin packages bags of flour at a rate of ..... cm^3 per minute.

(ii) A new cylindrical bag is designed to have the same capacity and to be more stable.

Melin decides to increase the area of the cross-section of its original bags by 100%.
Calculate the height of this new bag. [2]

END OF PAPER

Examiner only

8. (a) The population of Barbados in 1644 was said to be 30 000.

By 1964, the population of Barbados had increased by 682%.
From 1964 to 2014, the population of Barbados increased by a further 20%.

Calculate the population of Barbados in 2014.
You must show all your working. [3]

(b) The area of Barbados is 432 km^2.
The population of Barbados in September 2019 was 287 106.

Calculate the population density of Barbados in September 2019.
Give your answer correct to 2 significant figures. [3]

(c) The density of some of the sand in Barbados is 1442 kg/m^3.
Express this density in g/cm^3. [2]

END OF PAPER

Examiner only

9. (a) (i) Hubert has a quote from a gardener to landscape his garden.
The gardener will charge a total of £175, excluding VAT.
This total charge includes £55 for plants.
The remainder of the charge is for labour.

The gardener says it will take 8 hours to landscape Hubert's garden.
Calculate how much per hour the gardener is charging for labour. [2]

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(ii) VAT at 20% is payable on the charge of £175.
Calculate the total charge of the landscaping, including the VAT. [3]

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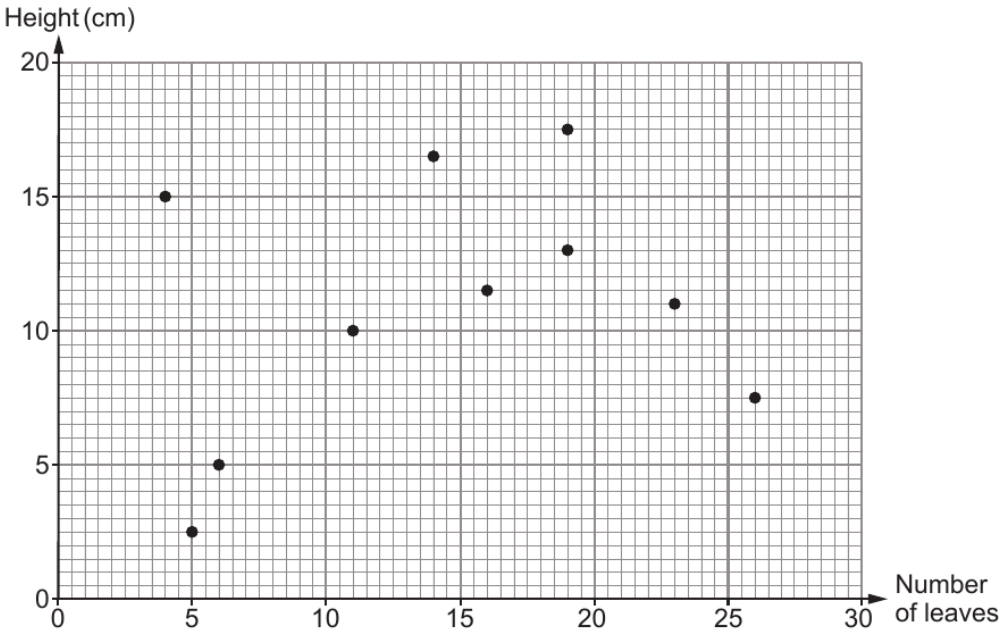
Examiner only

(b) The following summer, Hubert picked 10 different flowers from his garden.
He measured the height of each flower.
He also counted the number of leaves on each flower.
Here are his results.



(i) Is it possible to estimate the number of leaves on a flower of height 6 cm?

Yes ☐ No ☐

You must give a reason for your answer. [1]

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.....

(ii) How tall is the flower with the greatest number of leaves?
Circle your answer. [1]

26 cm 2·5 cm 7·5 cm 5 cm 17·5 cm

Examiner only

(iii) There are two flowers that each have 19 leaves.
Calculate the difference in the heights of these two flowers.
You must show all your working. [2]

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Difference in the heights is ..... cm

(iv) Calculate the percentage of the flowers that have **fewer than 23 leaves**. [2]

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..... % of the flowers have **fewer than 23 leaves**.

Examiner only

18. (a) Express 21·76 as a percentage of 32. [2]

(b) Solve $5t + 3 = 3t + 14$. [3]

END OF PAPER

Examiner only

19. Solve the following simultaneous equations using an algebraic (not graphical) method.
Do not use a trial and improvement method.
You must show all your working. [4]

$$3x + 5y = -2$$
$$5x + 4y = -12$$

END OF PAPER

Examiner only

20. (a) Calculate the value of $(3\times10^{4})\div(6\times10^{-3})$.
Give your answer in standard form. [2]

(b) Calculate the value of $(4\cdot78\times10^{4})+(1\cdot5\times10^{2})$.
Give your answer in standard form. [2]

Examiner only

21. (a) Which complete method, using Pythagoras's Theorem, can be used to find x?
Circle your answer. [1]

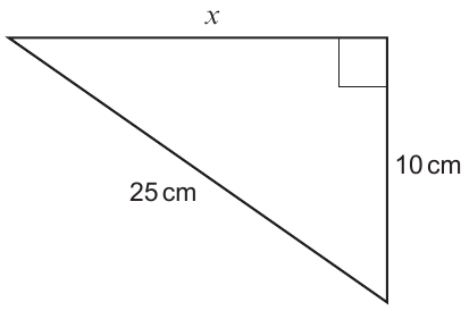


Diagram not drawn to scale

$x = 25^2 + 10^2$ $x = \sqrt{25^2 + 10^2}$ $x = 25^2 - 10^2$

$x = \sqrt{25^2 - 10^2}$ $x = \sqrt{(25 - 10)^2}$

(b) Which of the following calculations can be used to find y?
Circle your answer. [1]

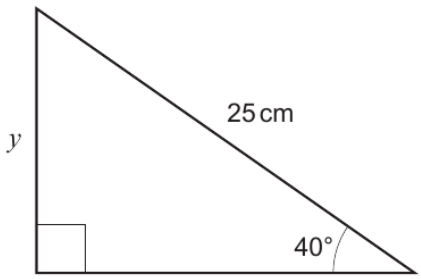


Diagram not drawn to scale

$\sin 25^\circ = y \times 40$ $\sin 40^\circ = \frac{25}{y}$ $\sin 25^\circ = \frac{y}{40}$

$\sin 40^\circ = \frac{y}{25}$ $\sin 40^\circ = y \times 25$

Examiner only

22. *P*, *Q* and *R* are points on the circumference of a circle with centre *O*.

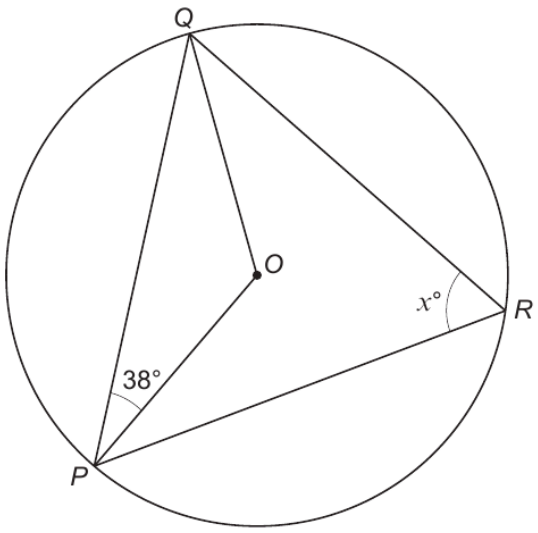


Diagram not drawn to scale

Calculate the value of x.
You must state **all** the angle properties that you use.
You must show all your working. [4]

Examiner only

23. On Monday morning, Twm picked n apples from a tree.
Ceri picked 5 times as many apples as Twm.

On Monday afternoon, Twm picked 19 more apples.
Ceri gave 7 of her apples to Twm.

Ceri still had more apples than Twm.

Write down an inequality in terms of n to show the above information.
Use your inequality to find the least possible number of apples Twm picked on Monday morning.
You must show all your working. [4]

END OF PAPER

Examiner only

19. (a) Express 48 as a percentage of 400. [2]

(b) Share £45 in the ratio 8 : 1. [2]

£ ..... and £ .....

(c) Express $1-\frac{1}{2^3}$ as a single fraction in the form $\frac{a}{b}$, where a and b are integers. [2]

Answer = ...

Examiner only

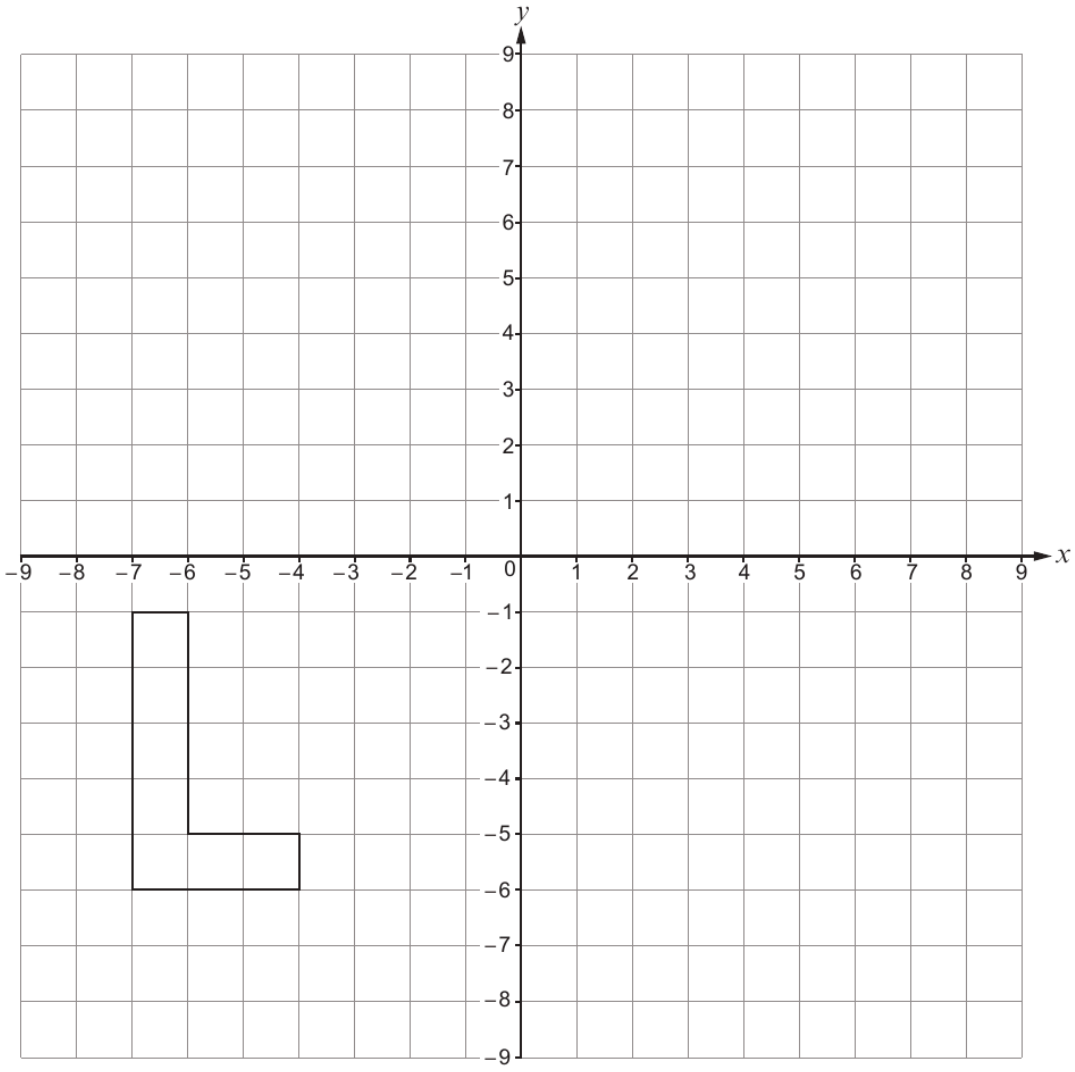
19. (a) Express 0·0076 in standard form. [1]

(b) Calculate the value of $(3 \times 10^{17}) \times (2 \times 10^{-12})$.
Give your answer in standard form. [1]

(c) Calculate the value of $(2{\cdot}3 \times 10^{4}) + (5 \times 10^{3})$.
Give your answer in standard form. [2]

Examiner only

20. Rotate the shape shown below by 90° anticlockwise about the origin. [2]



END OF PAPER

Examiner only

2. (a) Arwyn doubles the number fifty-three thousand.
Write Arwyn's answer in figures. [2]

(b) Write 3572 correct to the nearest 100. [1]

(c) Calculate $6+4\times9$. [1]

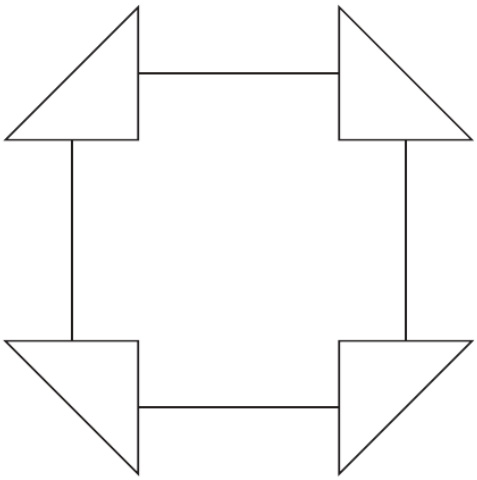
(d) Estimate $103\times9\cdot8$. [2]

(e) Can 626 be divided exactly by 3?
You must show working to support your answer. [1]

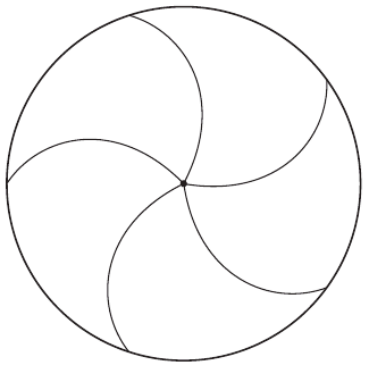
Yes ☐ No ☐

Examiner only

5. (a) Draw **all** the lines of symmetry on the shape below. [2]



(b) What is the order of rotational symmetry of the shape below? [1]



Order of rotational symmetry = ...

Examiner only

7. Jac is planning to visit the Empire State Building in New York.

(a) According to the internet, the Empire State Building has a total of 1172 miles of elevator cable.

Complete the following statement. [2]

There is a total of ..... **km** of elevator cable in the Empire State Building.

(b) The elevators in the Empire State Building were designed to move at a rate of 0·366 kilometres per minute.

Complete the following statement. [2]

The elevators in the Empire State Building were designed to move at ..... **metres per second.**

(c) Planners had an original budget of $60 million to construct the Empire State Building. It actually cost $41 000 000 to construct.

Complete the following statement.
Give your answer correct to 2 decimal places. [3]

Constructing the Empire State Building cost ..... % less than the original budget.

Examiner only

(d) More than 4 million people visit the Empire State Building each year.
What is 4 million written in standard form?
Circle your answer. [1]

4×10^{-5} $0\cdot4\times10^{5}$ 4×10^{5} 4×10^{6} 4×10^{7}

(e) The conversion rate at the exchange shop is £1 = $1.25.
The exchange shop only has $10 notes and $50 notes.

Jac has exactly £350.
He wants to exchange as close to £350 as possible for US dollars ($).
He asks for as **few** notes as possible.

Calculate:
- how many $10 notes and how many $50 notes Jac gets
- how much he pays for his currency.

You must show all your working. [6]

Examiner only

8. (a) (i) A single tree can absorb 48 **pounds** of carbon dioxide per year.
Calculate the carbon dioxide absorbed per year by a forest of 440 of these trees.
Give your answer in **kilograms**. [2]

Carbon dioxide absorbed per year is ..... kg

(ii) A forest of trees absorbs $2{\cdot}3 \times 10^{11}$ grams of carbon dioxide per year.
Which of the following is $2{\cdot}3 \times 10^{11}$?
Circle your answer. [1]

230 000 000 000 23 000 000 000 2 300 000 000 000

0·000 000 000 002 3 0·000 000 000 023

(b)

Remember:	$10\,000\,m^2 \approx 2{\cdot}47$ acres

A report states that a fire in a forest has a high risk of spreading when there are more than 60 trees per acre.

There are 615 trees in Grancwm Forest.
The forest covers an area of $40\,000\,m^2$.

Would a fire in Grancwm Forest have a high risk of spreading?

Yes ☐ No ☐

You must show all your working to support your answer. [4]

Examiner only

(c) A vertical pine tree stands on horizontal ground.
From a point on the ground 21 metres from its base, the angle of elevation of the top of the pine tree is 39°.

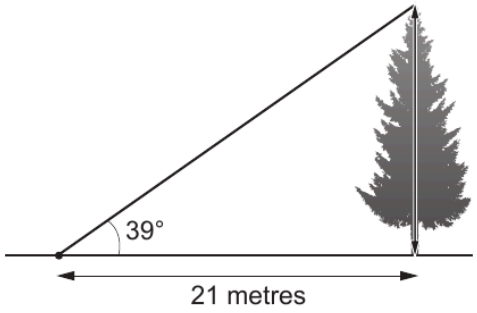


Diagram not drawn to scale

(i) Show that the pine tree has a vertical height of 17 metres. [3]

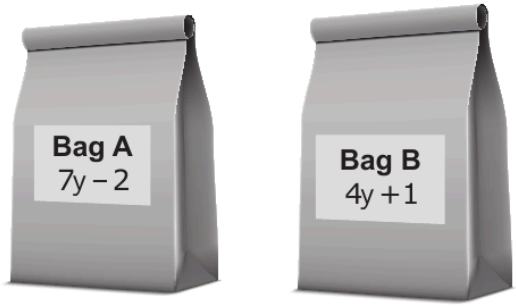
(ii) A cylindrical log is cut from this pine tree.
The **circumference** of the cross-section of the log is 1·75 m.
The length of the log is half the height of the tree.

Calculate the volume of the log.
Give your answer in m^3.
You must show all your working. [5]

Volume of the log is ..... m^3

Examiner only

8. There are $7y-2$ counters in Bag A.
There are $4y+1$ counters in Bag B.



9 counters are added to Bag B.
There are now the same number of counters in each bag.

Form an equation in terms of y.
Solve the equation to find the value of y.
You must show all your working. [4]

9. A cup contains some tea.

Elsie drinks $\frac{5}{7}$ of the tea.

There are 44 ml of tea left in the cup.
How much tea was in the cup before Elsie drank any? [2]

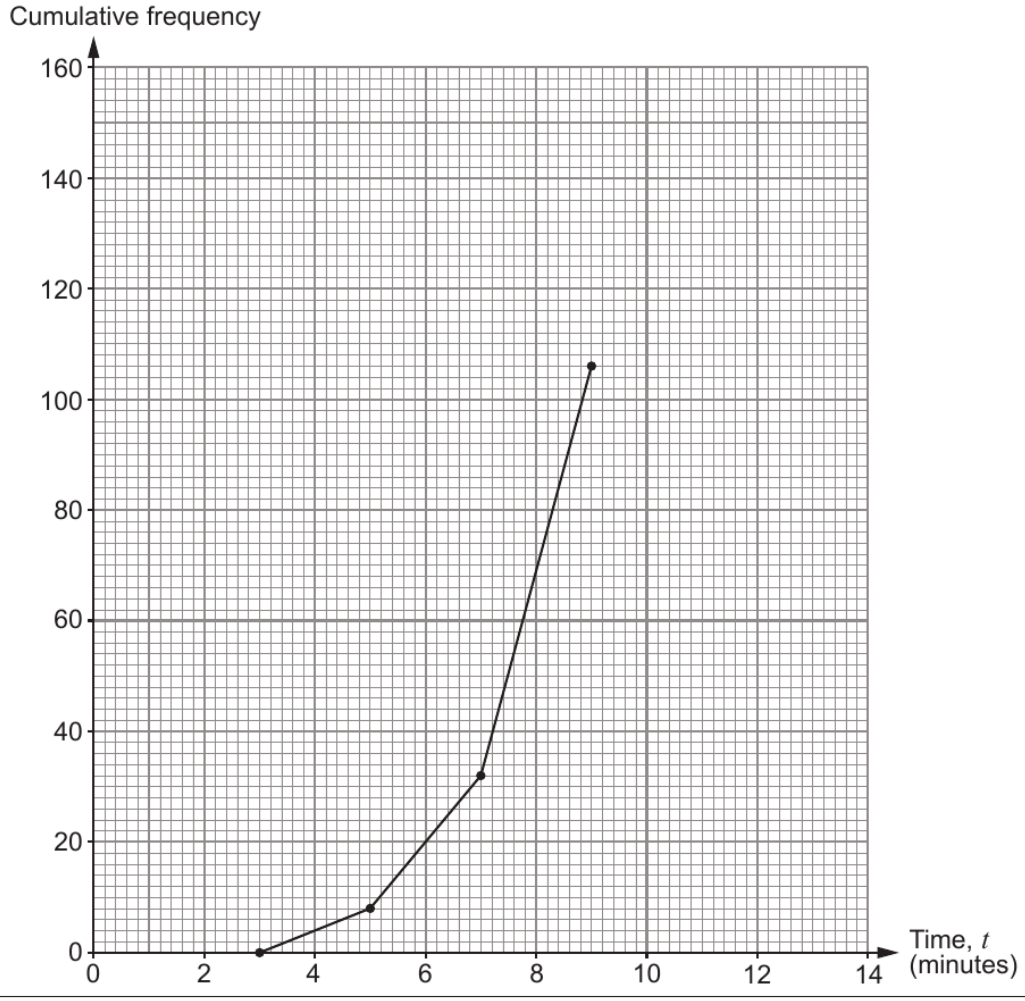
Examiner only

9. Giovanni has a takeaway pizza van. He sells whole pizzas and slices of pizza from his van.

(a) For the last 3 days, he has timed how long it takes to complete the food order for each of his customers.
Giovanni recorded his results in the table below.

(i) Complete the cumulative frequency table **and** the cumulative frequency diagram. [2]

Time, t (minutes)	Frequency	Cumulative frequency
$3 < t \leqslant 5$	8	8
$5 < t \leqslant 7$	24	32
$7 < t \leqslant 9$	74	106
$9 < t \leqslant 11$	40	.....
$11 < t \leqslant 13$	14	.....



Examiner only

Use your cumulative frequency diagram to give the best estimates for the answers to each of the following questions.

(ii) Find the median time taken to complete a food order. [1]

The median time is ..... minutes.

(iii) Giovanni is concerned that food orders are taking too long to complete.
He says,

"Only 25% of the food orders are completed in under ..... minutes."

Use **one** of the five values below to complete Giovanni's statement. [1]

6·4 6·6 7·2 8 9·6

(iv) Calculate the percentage of orders that were completed in less than 6 minutes. [2]

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(b) For the last 3 days:
- Giovanni spent £180 on ingredients
- he spent £220 on the running costs for the pizza van
- he received a total of £700 from the food orders.

Calculate Giovanni's percentage profit. [3]

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(c) Next year Giovanni intends to charge £8.40 for a basic pizza.
This is an increase of 20% from the current charge.

Calculate how much Giovanni currently charges for a basic pizza. [2]

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Examiner only

11. Jac is planning to visit the Empire State Building in New York.

(a) According to the internet, the Empire State Building has a total of 1172 miles of elevator cable.

Complete the following statement. [2]

There is a total of ..... **km** of elevator cable in the Empire State Building.

(b) The elevators in the Empire State Building were designed to move at a rate of 0·366 kilometres per minute.

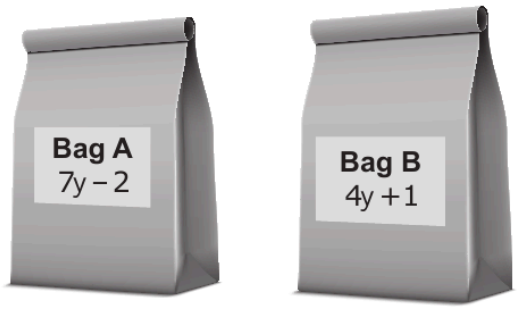
Complete the following statement. [2]

The elevators in the Empire State Building were designed to move at ..... **metres per second**.

END OF PAPER

Examiner only

18. There are $7y-2$ counters in Bag A.
There are $4y+1$ counters in Bag B.



9 counters are added to Bag B.
There are now the same number of counters in each bag.

Form an equation in terms of y.
Solve the equation to find the value of y.
You must show all your working. [4]

END OF PAPER

Examiner only

20. The diagram shows two circles that fit in a rectangle.
The centre of the small circle is directly below the centre of the large circle.
The diameter of the small circle is 8 cm.
The **radius** of the large circle is 2 cm greater than the **radius** of the small circle.

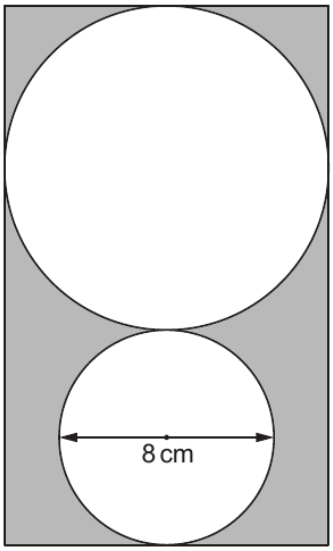


Diagram not drawn to scale

Calculate the total area of the shaded parts of the rectangle. [5]

END OF PAPER

Examiner only

2. (a) There is one square number between 180 and 200.
What is this square number? [1]

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(b) A number has exactly **four** factors.
All of the factors are less than 30.
Three of the factors are 1, 2 and 26.
What is the other factor? [1]

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(c) *In this part of the question, you will be assessed on the quality of your accuracy in writing.*

Which length is exactly halfway between 280 m and 410 m?
You must show all your working. [2 + 1 W]

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Examiner only

4. (a) Circle **all** the fractions that are equal to $\frac{5}{6}$. [2]

$\frac{45}{56}$ $\frac{55}{66}$ $\frac{45}{46}$ $\frac{35}{42}$ $\frac{51}{61}$

(b) Calculate $\frac{\sqrt{0 \cdot 64}}{4^2}$. [1]

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(c) Here are four digits.

7 3 6 5

Write the four digits in the following boxes to form two 2-digit numbers.
You need to arrange the four digits so that the **product** is as **small** as possible.

You can use each digit only once. [2]

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Space for working:

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Examiner only

5. (a) Siôn has an ice cream van.

On Monday, Siôn sold three times as many ice creams as cold drinks.
He sold 50 cold drinks on Monday.
Siôn sells ice creams for £1.80 each.

Calculate the amount of money Siôn took from selling ice creams on Monday. [4]

(b) Siôn keeps ice cream in a freezer in his van.
Every hour he checks the temperature in his freezer.
He turns on his freezer at 8 a.m.
The readings he takes from 8 a.m. to 3 p.m. are listed below.

10°C 2°C –5°C –12°C –12°C –12°C –13°C –14°C

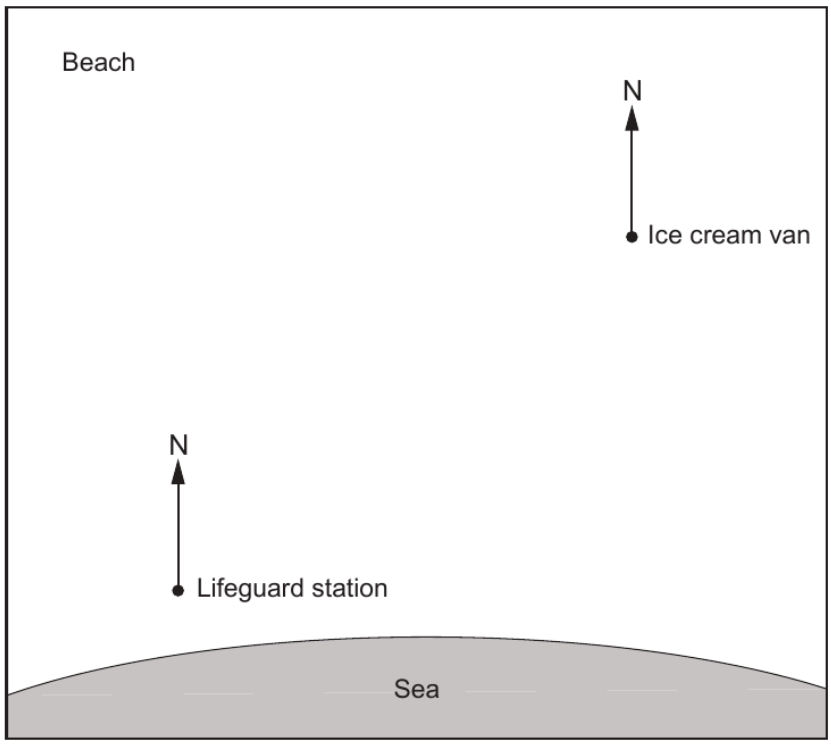
(i) Calculate the mean of these temperatures. [3]

(ii) At 4 p.m. the temperature in Siôn's freezer was recorded as –16°C.
Calculate the mean of the temperatures recorded in Siôn's freezer from 8 a.m. to 4 p.m. [2]

Examiner only

(c) Siôn parks his ice cream van on the beach, as shown on the map below.

Scale: 1 cm represents 20 metres



(i) How far is Siôn's ice cream van from the lifeguard station? [2]

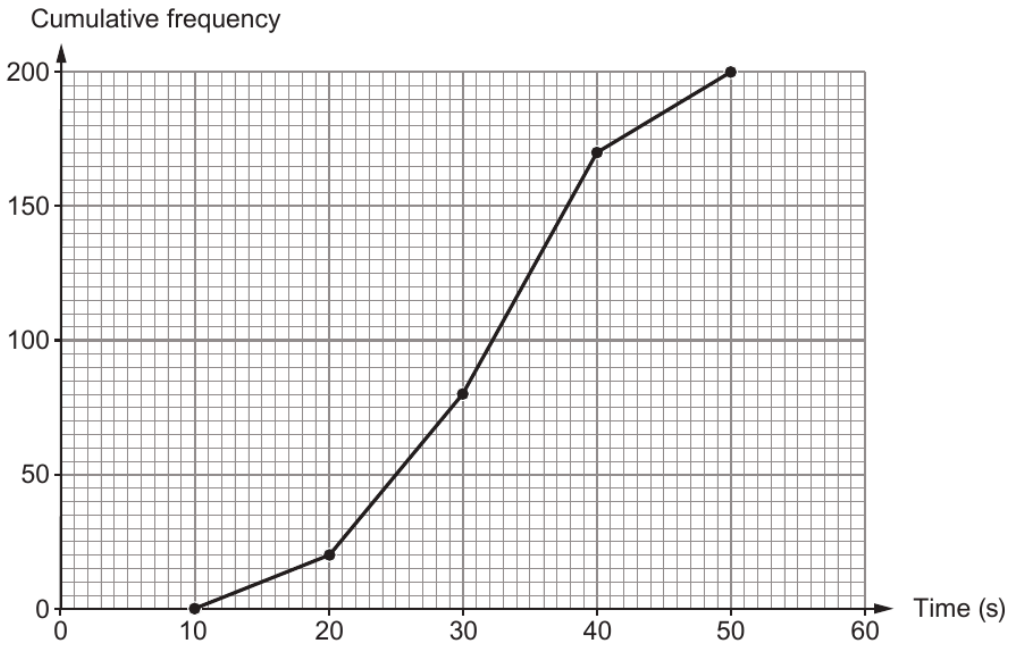
..... metres

(ii) Complete the following statement.

'The bearing of the lifeguard station from Siôn's ice cream van is .....°.' [1]

Examiner only

8. (a) On 1st June last year, 200 customers used cash to pay at Shop Lil.
The cumulative frequency diagram represents the time each of these 200 customers waited to be given change at the checkout.



(i) How many of these customers waited between 30 and 50 seconds for their change? [2]

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(ii) Use the graph to estimate the median time these 200 customers waited for their change.
Circle your answer. [1]

24 seconds 32 seconds 38 seconds 80 seconds 100 seconds

(iii) Calculate the fraction of these 200 customers who waited 40 seconds or longer for their change.
Give your answer in its simplest form. [2]

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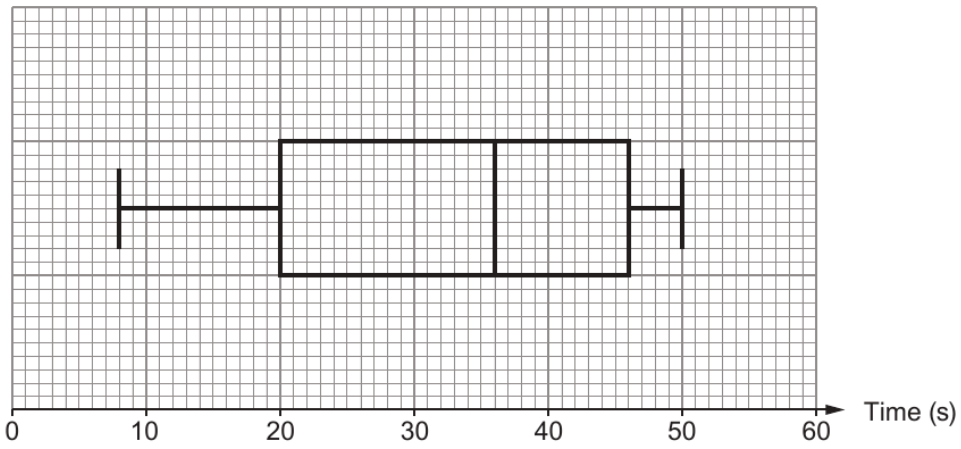
Examiner only

(b) On 1st June this year, the manager at Shop Lil drew a box-and-whisker plot of the times 200 customers waited for their change at the checkout.



Based on the results of these 200 customers, the manager made the following statements. Complete the statements.

(i) "On 1st June this year, 50% of our customers were given their change in ..... seconds or less." [1]

(ii) "On 1st June this year, the interquartile range of the times taken to give customers their change was ..... seconds." [2]

.....

.....

(c) Consider the 50 customers waiting the **longest** times to get their change on 1st June last year and this year.
Has the speed of giving change at the checkout improved since last year?

Yes ☐ No ☐

You must give a reason for your answer. [1]

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Examiner only

9. (a) Siôn has an ice cream van.

On Monday, Siôn sold three times as many ice creams as cold drinks.
He sold 50 cold drinks on Monday.
Siôn sells ice creams for £1.80 each.

Calculate the amount of money Siôn took from selling ice creams on Monday. [4]

(b) Siôn keeps ice cream in a freezer in his van.
Every hour he checks the temperature in his freezer.
He turns on his freezer at 8 a.m.
The readings he takes from 8 a.m. to 3 p.m. are listed below.

10°C 2°C –5°C –12°C –12°C –12°C –13°C –14°C

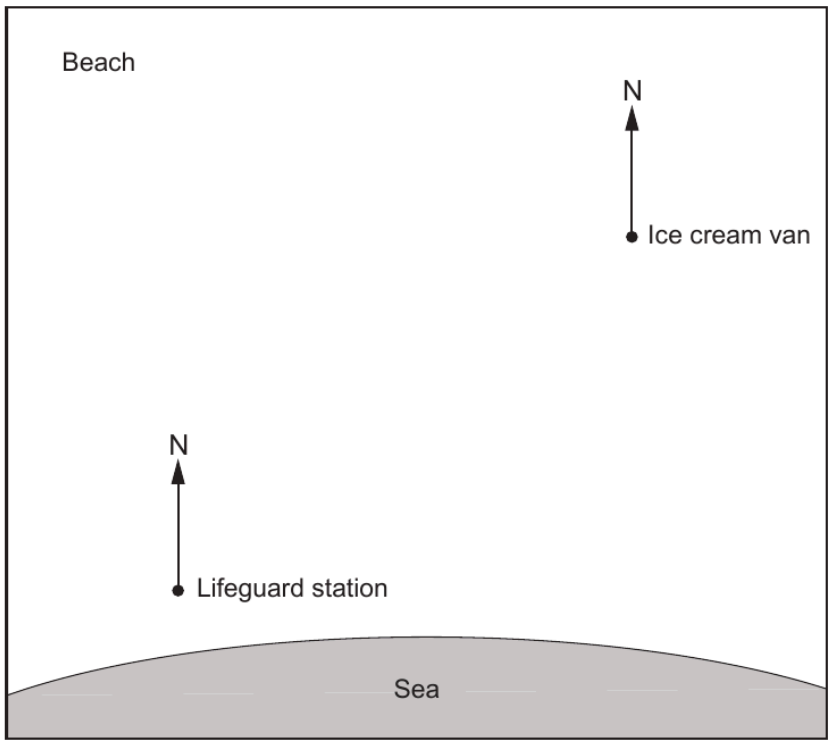
(i) Calculate the mean of these temperatures. [3]

(ii) At 4 p.m. the temperature in Siôn's freezer was recorded as –16°C.
Calculate the mean of the temperatures recorded in Siôn's freezer from 8 a.m. to 4 p.m. [2]

Examiner only

(c) Siôn parks his ice cream van on the beach, as shown on the map below.

Scale: 1 cm represents 20 metres



(i) How far is Siôn's ice cream van from the lifeguard station? [2]

..... metres

(ii) Complete the following statement.

'The bearing of the lifeguard station from Siôn's ice cream van is .....°.' [1]

END OF PAPER

Examiner only

9. During the 30 days in the month of September, Andras used 138 m^3 of gas.
The cost of this gas was 12p per kWh.

> The formula used to calculate the number of kWh for the gas used is as follows:
>
> Number of kWh = number of m^3 of gas × 39·5 × 1·02264 ÷ 3·6

The standing charge was 32p per day.
VAT at 5% was payable on the sum of the cost of the gas used and the standing charge.

Calculate Andras's gas bill for September.
You must show all your working. [7]

Examiner only

9. (a) A volcano is an opening in the Earth's crust, through which molten lava, hot ash and gases escape into the air.

(i) An estimated 500 000 000 people live near active volcanoes.
What is 500 000 000 written in standard form? [1]

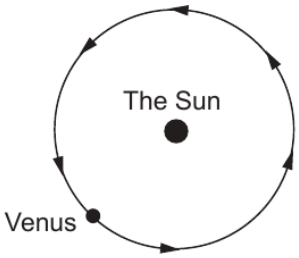
(ii) The teragram is a unit of mass.
1 teragram = 10^9 kg

Last year, a volcano released a total of 140 teragrams of carbon dioxide in 300 days.

Calculate the average number of kilograms of carbon dioxide that were released by this volcano **per hour**.
Give your answer correct to 3 significant figures.
You must show all your working. [5]

Examiner only

(b) (i) The planet Venus orbits the Sun.
Its orbit can be considered to be circular.



The distance between Venus and the Sun is $1{\cdot}08 \times 10^8$ km.

Venus orbits the Sun once every 224·7 days.

Calculate the distance Venus travels in 1 day.
Give your answer in standard form. [4]

(ii) The surface area of Venus is 460 234 320 km^2.
The surface of Venus is wrinkled-volcanic, smooth-volcanic or **non**-volcanic.
The areas of these three different types of surface are in the ratio 7 : 1 : 2.

Wrinkled-volcanic : Smooth-volcanic : Non-volcanic = 7 : 1 : 2

Calculate the total surface area of Venus that **is** volcanic.
You must show all your working. [3]

END OF PAPER

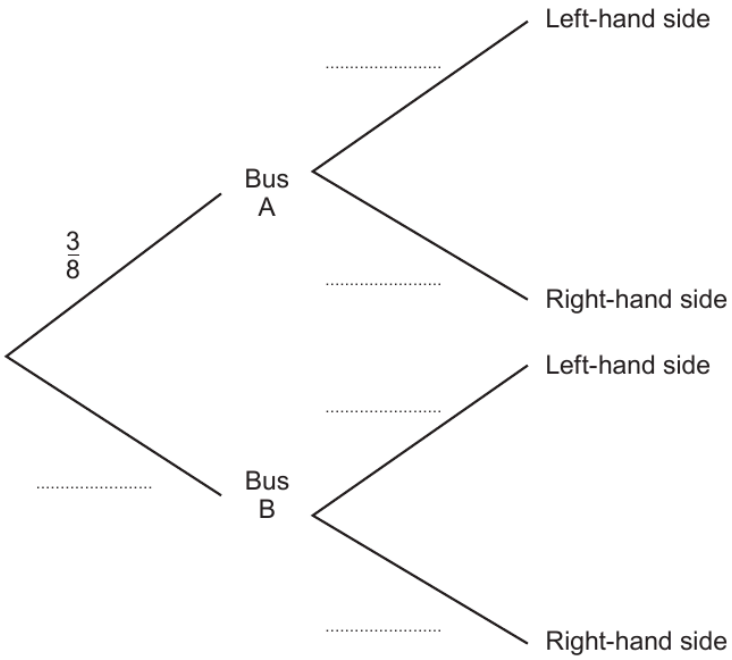
Examiner only

15. A group of people hired two buses, Bus A and Bus B, to take them home from a party.
Bus A left the party at 11:00 p.m.
Bus B left the party at midnight.

A person from the group is chosen at random.
The probability that this person left the party on Bus A is $\frac{3}{8}$.

The probability that this person sat on the left-hand side of the bus is equal to the probability that this person sat on the right-hand side.

(a) Complete the following tree diagram. [2]



(b) What is the probability that this person sat on the right-hand side of the bus that left at midnight? [2]

Examiner only

18. The employees of a company belong to one of three departments: *Management (M)*, *Sales (S)* or *Distribution (D)*.

The diagram below is a sketch of a pie chart.
The diagram shows the proportion of employees working in each of these departments.

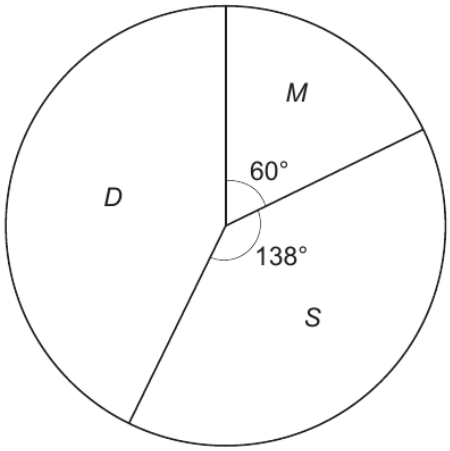


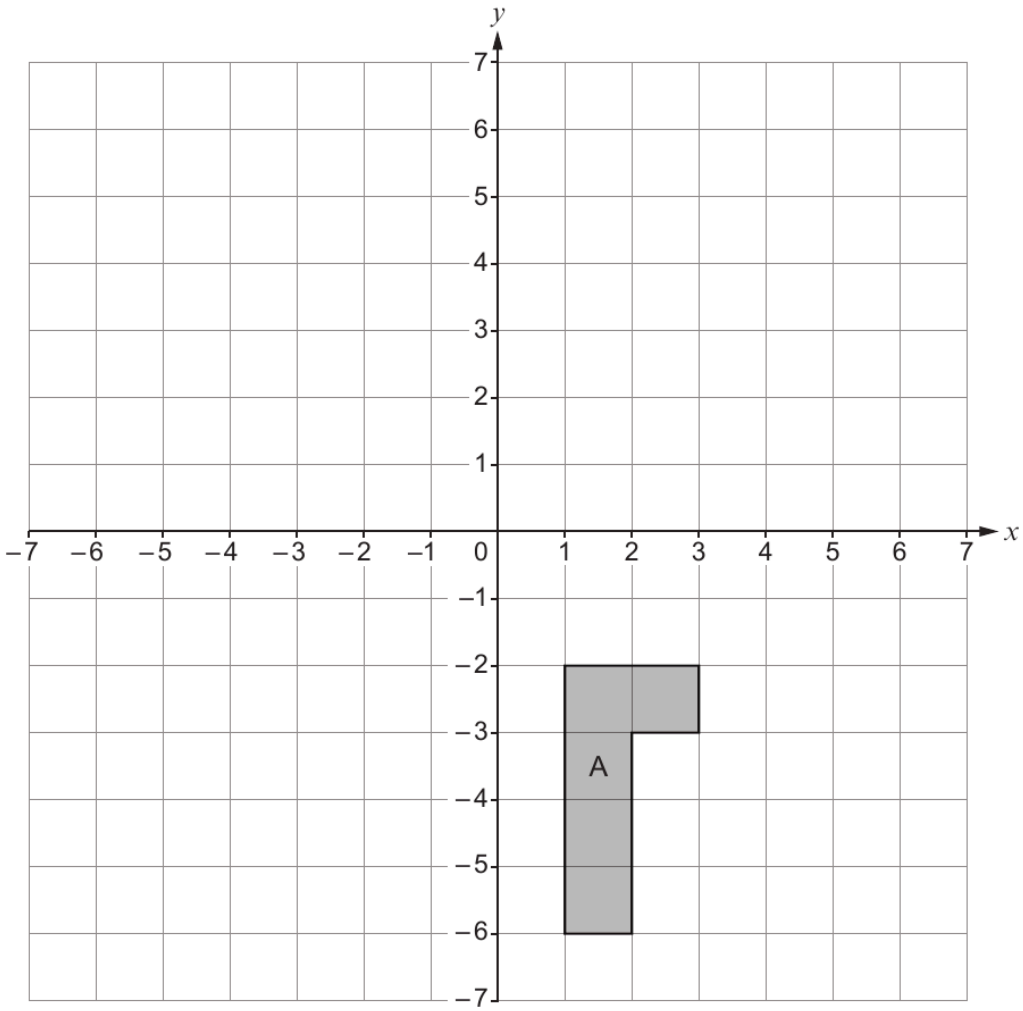
Diagram not drawn to scale

An employee is chosen at random.
Calculate the probability that this employee works in the *Distribution* department.
Give your answer as a decimal. [3]

END OF PAPER

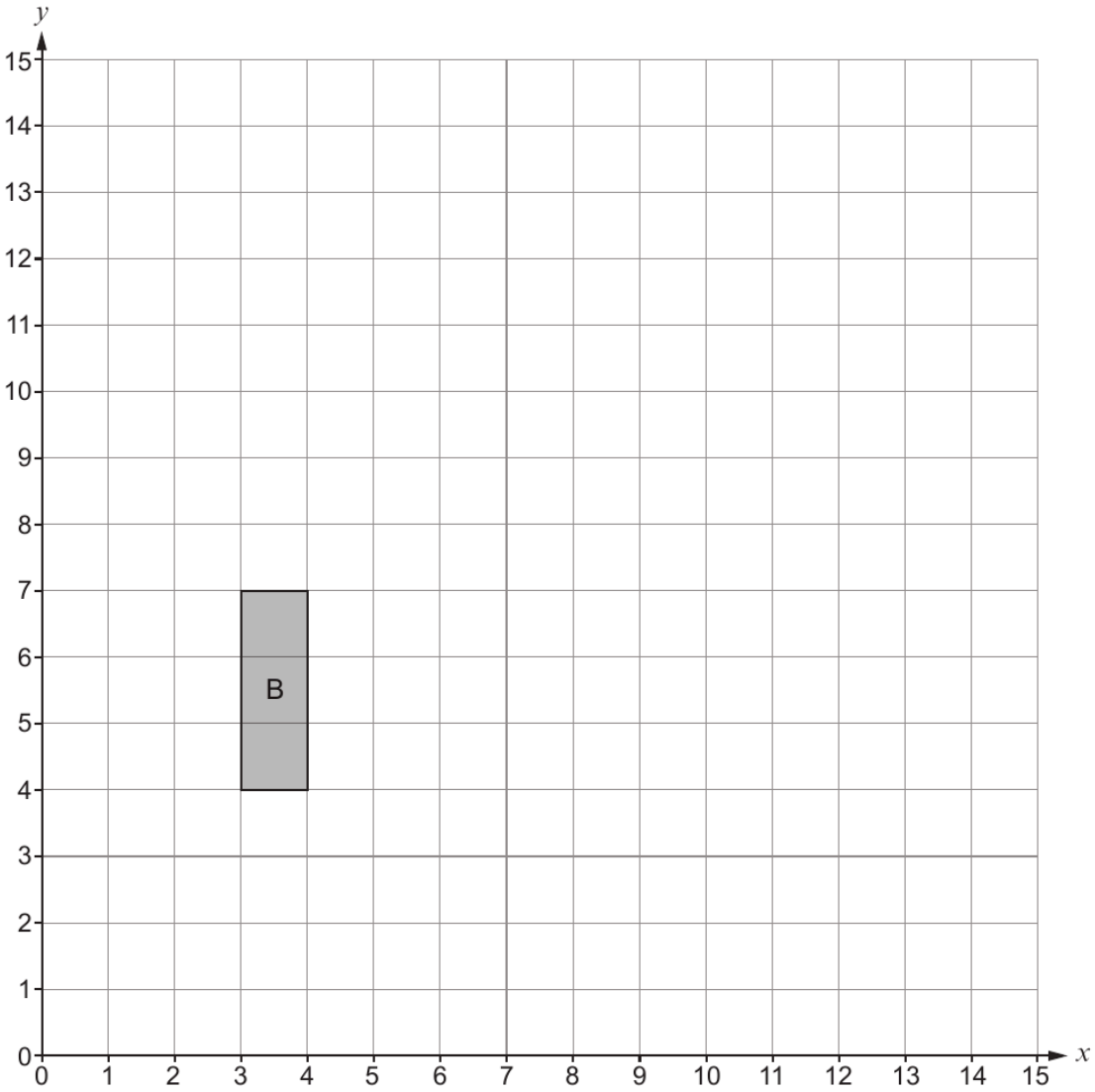
Examiner only

19. (a) Reflect the shape A in the line $x = -1$. [2]



Examiner only

(b) Enlarge the shape B by a scale factor of 2, using (1, 3) as the centre of enlargement. [3]



END OF PAPER

Examiner only

20. Aled and Berwyn share £x in the ratio 2 : 3.

(a) Aled's share of the money is £0·4x.
What is Berwyn's share of the money in terms of x? [1]

(b) Carys and Delyth share the same amount, £x, in the ratio 3 : 7.

Show that one of these four people receives the same amount as the combined total of two of the other people. [3]

END OF PAPER

Examiner only

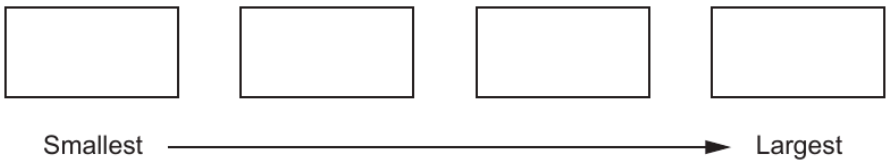
8. (a) Solve $7x = 63$. [1]

(b) Solve $27 - x = 19$. [1]

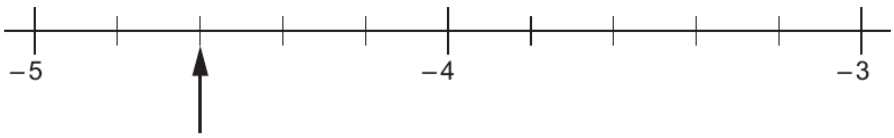
(c) Simplify $17k - 8k + 5k$. [1]

9. (a) Write these numbers in order in the boxes below.
Start with the smallest number. [1]

3 −17 12 −6



(b) A number line is shown below.
Which number is the arrow pointing to? [1]



The number is .....

Examiner only

9. (a) The base of a flagpole is fixed to horizontal ground.
It is held vertically by a straight rod of length 3·8 m.
The rod is fixed to the ground and to a point 1·5 m from the top of the flagpole.
The flagpole and the rod are shown in the diagram below.

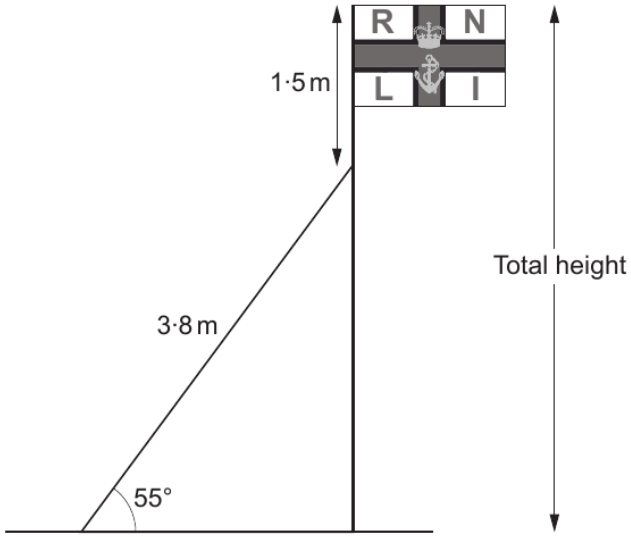


Diagram not drawn to scale

Calculate the **total** height of the flagpole.
Give your answer correct to the nearest centimetre. [4]

Examiner only

(b) Mathematically similar large, medium and small flags are made.

Diagrams not drawn to scale

(i) Calculate the length of the medium flag. [2]

.....

.....

.....

.....

Length of the medium flag is ..... cm

(ii) Calculate the height of the small flag. [2]

.....

.....

.....

.....

Height of the small flag is ..... cm

Examiner only

15. Solve each of the following equations.

(a) $3y - 5 = 19$ [2]

(b) $8p + 5 = 3p - 25$ [3]

Examiner only

17. The shape below has rotational symmetry of order 6.

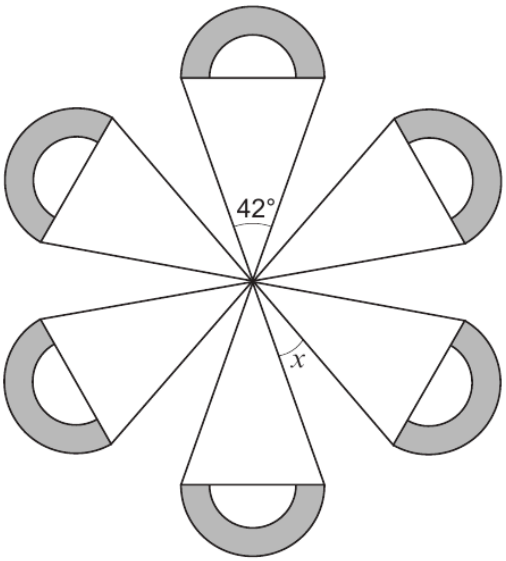


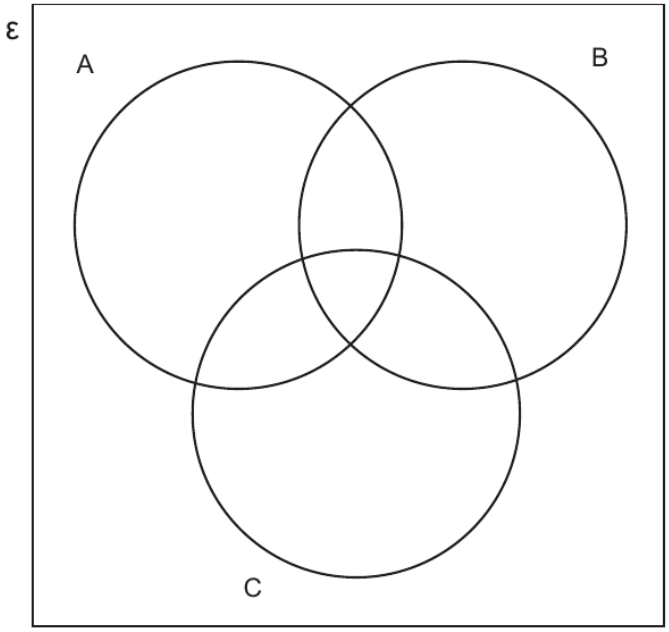
Diagram not drawn to scale

Find the size of angle x.
You must show all your working. [4]

Examiner only

18. Display the following information in the Venn diagram below. [4]

- Universal Set ε = {Integers between 1 and 7 inclusive}
- Set A = {even numbers}
- Set B = {factors of 6}
- Set C = {prime numbers}



END OF PAPER

Examiner only

18. 2400 tickets were sold for a concert.
The table below shows the cost of the different types of ticket.

Ticket	Cost per ticket
SEATED	£45
STANDING	£23

The total cost of all the 2400 tickets sold was £89 520.

Let x represent the number of seated tickets sold.
Let y represent the number of standing tickets sold.

(a) Complete the following table. [1]

	Equation in terms of x and y
Total number of tickets sold	$x + y = 2400$
Total cost of tickets sold	

(b) Use an algebraic method to find the value of x and the value of y.
You must show all your working. [3]

The number of seated tickets sold, x = ...

The number of standing tickets sold, y = ...