Name	Date started	Target end date

REVISE
.wales

F1.14 — Metric & imperial units; estimating measurements

Spec 3.5.2, 3.5.6, 3.5.7 — Unit 1 (calculator allowed)

Choosing and converting between metric and imperial units of length, mass and capacity, and estimating sensible measurements for everyday objects. 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 3 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (42 marks across 25 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 allowed on every question in this pack (Unit 1 is the calculator-allowed paper).

Metric & imperial units; estimating measurements — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 1: calculator-allowed.

Metric conversions 3.5.2

- Convert between mm, cm, m and km.
- Convert between g, kg and tonnes.
- Convert between ml, cl and litres.

Imperial & metric link 3.5.7

- Use given conversion factors between metric and imperial units.
- Convert miles and kilometres using 1 mile ≈ 1.6 km.
- Convert litres and gallons using 1 gallon ≈ 4.5 litres.

Estimating 3.5.6

- Estimate the length, mass or capacity of everyday objects.
- Choose an appropriate unit for a given measurement.
- Use estimates to check the reasonableness of an answer.

Exam strategy 3.5

- Always convert to a single unit before adding or subtracting.
- Quote the unit in the final answer.
- Sense-check: a pencil isn't 30 cm thick.

Crib sheet »

Metric & imperial units; estimating measurements in one page

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

Metric length

1 km = 1000 m · 1 m = 100 cm · 1 cm = 10 mm.

So 1 m = 1000 mm · 1 km = 100 000 cm.

Metric mass & volume

Mass: 1 kg = 1000 g · 1 tonne = 1000 kg.

Volume: 1 litre = 1000 ml · 1 cm^3 = 1 ml.

Converting up vs down

Smaller unit → bigger unit: divide.

Bigger unit → smaller unit: multiply.

2400 m = 2.4 km · 3.2 kg = 3200 g.

Imperial & mixed

1 foot = 12 inches · 1 yard = 3 feet · 1 stone = 14 lb.

1 mile ≈ 1.6 km · 1 kg ≈ 2.2 lb · 1 gallon ≈ 4.5 litres.

Estimating

Door height ≈ 2 m · bag of sugar ≈ 1 kg · can of drink ≈ 330 ml.

Adult walking speed ≈ 5 km/h.

Common traps

- Mixing units in one calculation (cm with m).
- Forgetting cm^3 vs cm for volume vs length.
- Using 1 km = 100 m instead of 1000 m.

Examiner only

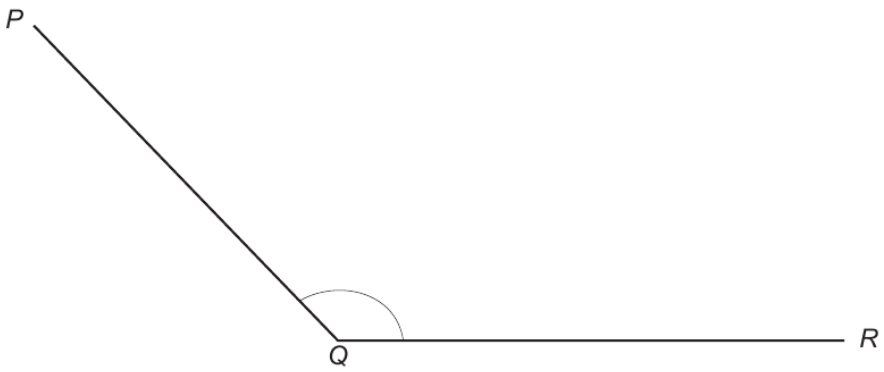
1. *(a)* Measure the length of the line *AB*.
Write your answer in centimetres. [1]

AB ..... cm

(b) In the space below, draw a circle with a radius of 6 cm. [1]

Examiner only

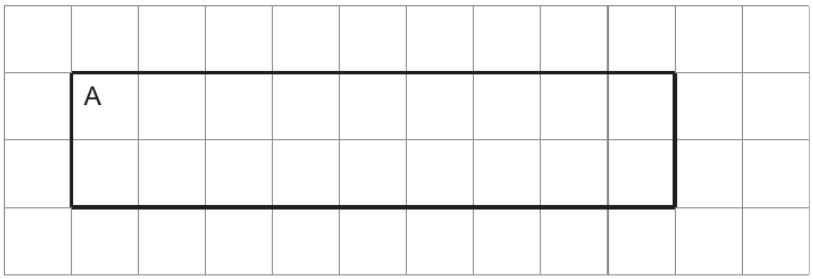
(c) Measure and write down the size of $P\hat{Q}R$. [1]



$P\hat{Q}R$ = ... °

Examiner only

4. *(a)* Rectangle A is drawn on the centimetre square grid below.



(i) What is the perimeter of rectangle A? [1]

.....

.....

Perimeter = ...

(ii) What is the area of rectangle A?
Give the units of your answer. [2]

.....

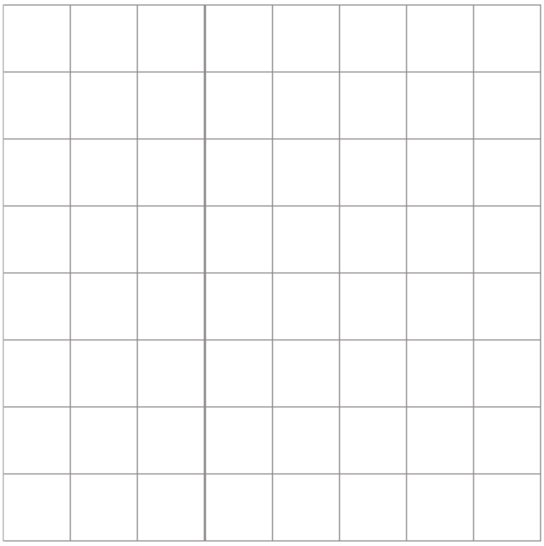
.....

Area = ...

Examiner only

(b) Rectangle B has the same area as rectangle A and fits on the centimetre square grid below.
Rectangle B has a different perimeter from rectangle A.

Draw rectangle B on the grid below. [1]



....

....

Examiner only

2. *(a)* Which metric unit is best used to measure the distance from Cardiff to Manchester?
Circle the correct answer. [1]

millimetres kilometres metres litres centimetres

(b) Which metric unit is best used to measure the mass of a person?
Circle the correct answer. [1]

kilograms grams tonnes kilometres milligrams

3. Jo thinks of a number.
Her number lies between 30 and 50.
Jo's number is a multiple of 3.
Jo's number is also a multiple of 7.

What number does Jo think of? [2]

.....

.....

.....

.....

Jo's number is .....

Examiner only

3. *(a)* Circle the longest time period from the list given below. [1]

180 minutes 4·5 hours 4 hours 45 minutes $4\frac{1}{4}$ hours $\frac{1}{6}$th of a day

(b) Circle the longest distance from the list given below. [1]

30 000 mm 250 m 2 km 70 m 4 000 cm 2·4 km

(c) Circle either TRUE or FALSE for each statement given below. [2]

STATEMENT		
7 kilometres is less than 5 miles	TRUE	FALSE
1 kilogram is less than 2 pounds (lb)	TRUE	FALSE
1 litre is less than 1 pint	TRUE	FALSE
8 litres is less than 900 cm^3	TRUE	FALSE

Examiner only

12. *(a)* Find the value of $5f + 7g$ when $f = 3{\cdot}8$ and $g = -2{\cdot}6$. [2]

(b) Solve the following equation.
Give your answer correct to 1 decimal place. [3]

$$7x - 4 = 12$$

Examiner only

7. Find the whole number which satisfies all of the following conditions:

- It is a whole number between 1 and 40 inclusive.
- The number is a multiple of 4 but not a multiple of 8.
- 3 is a factor of this number.
- The number is a square number. [3]

The whole number is .....

Examiner only

17. Find the whole number which satisfies all of the following conditions:

- It is a whole number between 1 and 40 inclusive.
- The number is a multiple of 4 but not a multiple of 8.
- 3 is a factor of this number.
- The number is a square number. [3]

The whole number is .....

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

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

.....

.....

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

.....

.....

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

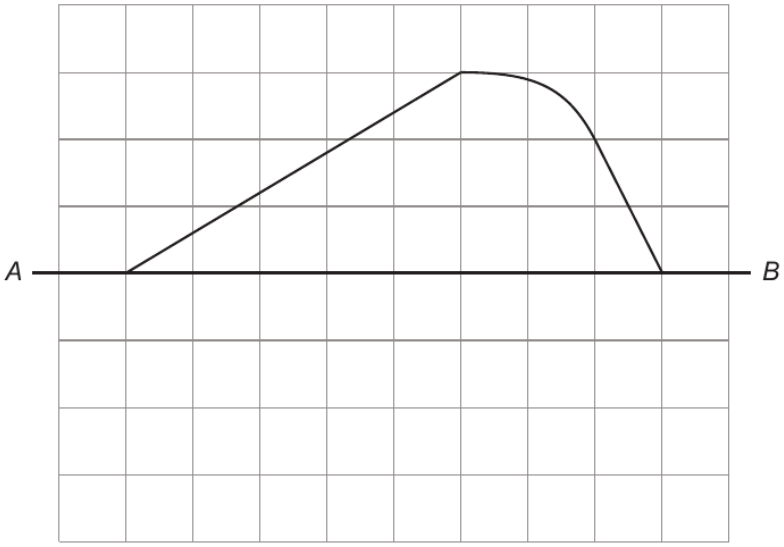
28 31 28 29 31 28 34 24 32

.....

.....

Mode is .....

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



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."

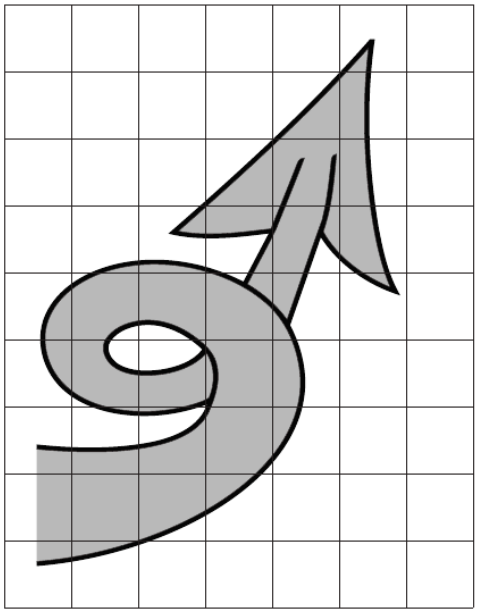
Is Ian correct?
Give a reason for your answer. [1]

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.

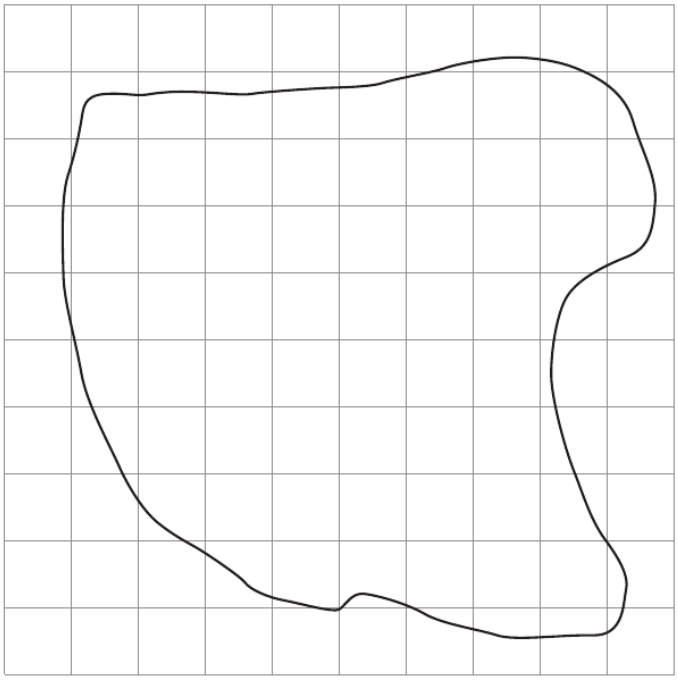
Decide whether or not the manager is correct.
You must show all your working. [3]

The manager is:

Correct ☐ Not correct ☐

Examiner only

3.



The shape above has been drawn on a centimetre-square grid.

Estimate the area of the shape. [2]

.....

.....

.....

.....

Area of the shape = ... cm^2

Examiner only

4. (a) Jenny is planning to sow grass seed in her garden.
The plan for her garden is shown below.

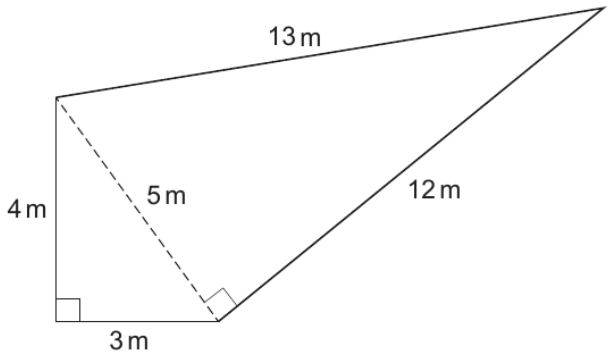


Diagram not drawn to scale

Grass seed to cover 1 m^2 costs 30p.
Calculate how much it will cost Jenny to buy the grass seed she needs. [4]

(b) (i) Jenny's neighbour, 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]

Examiner only

(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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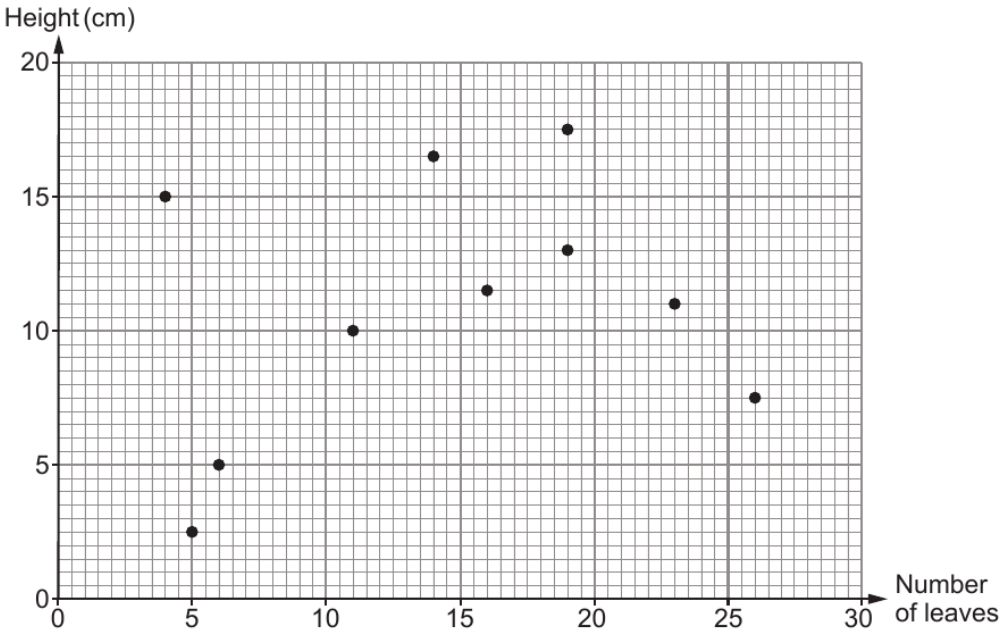
.....

.....

Examiner only

(c) 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]

.....

.....

(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

5. (a) Write 0·034 35 correct to two significant figures.
Circle your answer. [1]

0·03 0·033 0·0344 0·034 0·034 00

(b) Convert 6·7 m^2 into cm^2.
Circle your answer. [1]

670 6700 67 000 670 000 6 700 000

(c) Factorise $12e + 15$.
Circle your answer. [1]

$27e$ $3(4e + 5)$ $12(e + 15)$ $5(12e + 3)$ $15(0 \cdot 8e + 3)$

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]

.....

.....

.....

.....

.....

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

.....

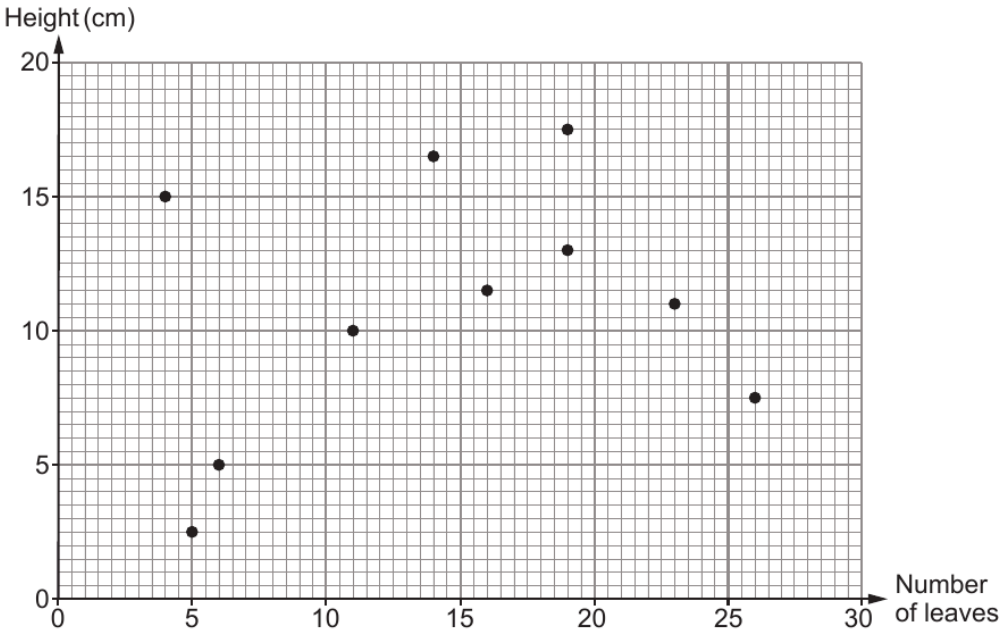
.....

.....

.....

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]

.....

.....

(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]

.....

Difference in the heights is ..... cm

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

.....

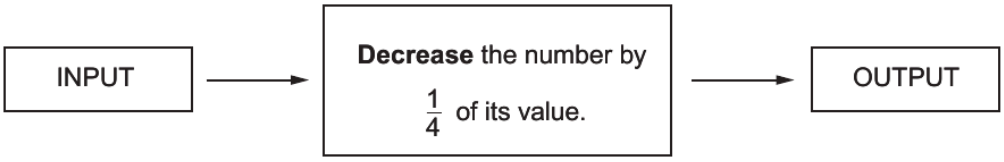
.....

.....

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

Examiner only

10. A number machine is shown below.



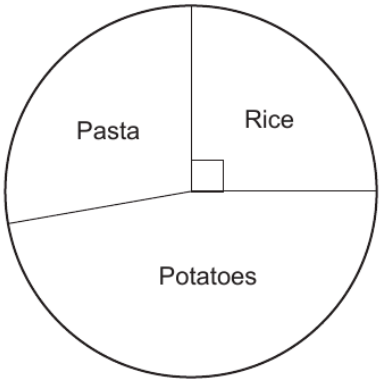
For a given INPUT number, there will be an OUTPUT number.
The OUTPUT is then put back in the number machine as the next INPUT.
This process is then repeated many times.

The first INPUT number is 512.
What will be the first OUTPUT number that is less than 300? [4]

First OUTPUT number that is less than 300 = ...

Examiner only

2. In a survey, 540 people were asked if they preferred pasta, rice or potatoes.
They were asked to choose just one preference.
The results are displayed in the accurately-drawn pie chart below.



(a) How many people preferred rice? [2]

..... people

(b) The sector for potatoes on the pie chart is to be split.
40% of the people who chose potatoes said they preferred chips.

What will be the size of the angle in the sector for **chips**?
You must show all your working. [3]

..... °

(c) 540 people took part in the survey. $\frac{7}{10}$ of these people were children..
How many people who took part in the survey were **not** children? [2]

Number of people who were **not** children .....

Examiner only

7. (a) Tomos uses the recipe below to make mushroom risotto.
This recipe serves 4 people.

Mushroom Risotto serves 4 people

400 g mushrooms
8 spring onions
25 g butter
200 g rice
1 litre stock
50 g cheese

(i) How many **kilograms** of rice would Tomos need to make mushroom risotto for 48 people? [2]

.....

.....

.....

.....

..... kg of rice

(ii) Write the ratio of the quantities of butter to rice to cheese in its simplest form. [2]

.....

.....

butter : rice : cheese = ... : ..... : .....

Examiner only

(b) The table below shows the amount of nutrition in one serving of mushroom risotto.

Nutrition per serving					
Fat	Carbohydrates	Sugars	Fibre	Protein	Salt
15 g	37 g	6 g	5 g	14 g	1 g

(i) A serving of mushroom risotto gives $\frac{1}{6}$ of the maximum amount of salt recommended per day for anyone aged 11 or older.

What is the maximum amount of salt recommended per day for anyone aged 11 or older?
Circle your answer. [1]

1 g 5 g 6 g 10 g 60 g

(ii) The formula below gives the daily recommended mass of protein.

Mass of protein in **grams** = 0·8 × body mass in kg

Tomos has a body mass of 70 kg.
What **percentage** of his daily recommended mass of protein is there in one serving of mushroom risotto? [4]

Examiner only

17. The diagram below shows two shaded squares inside a larger square.

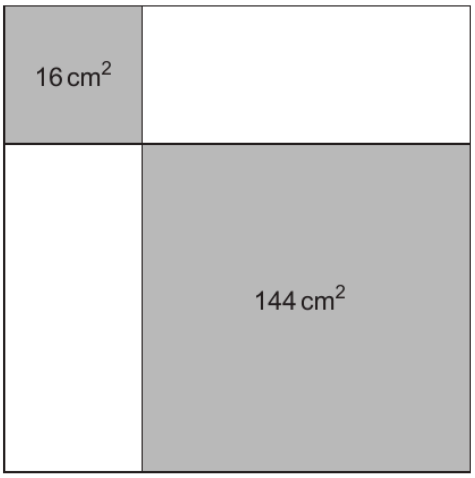


Diagram not drawn to scale

The diagram shows the area of each of the two shaded squares.

Calculate the **total** area of the two regions that have **not** been shaded.
You must show all your working. [5]

Examiner only

19.

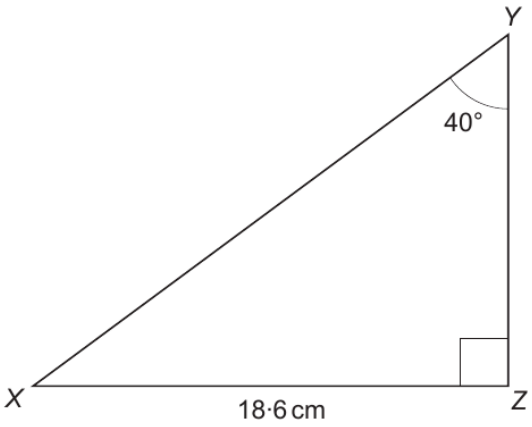


Diagram not drawn to scale

Calculate the length of the side *YZ*. [3]

20. 7 cubes are stacked on top of each other.
Each of these cubes has edges of length 60 mm, measured correct to the nearest millimetre.

Calculate the greatest possible height of this stack of 7 cubes. [2]

Examiner only

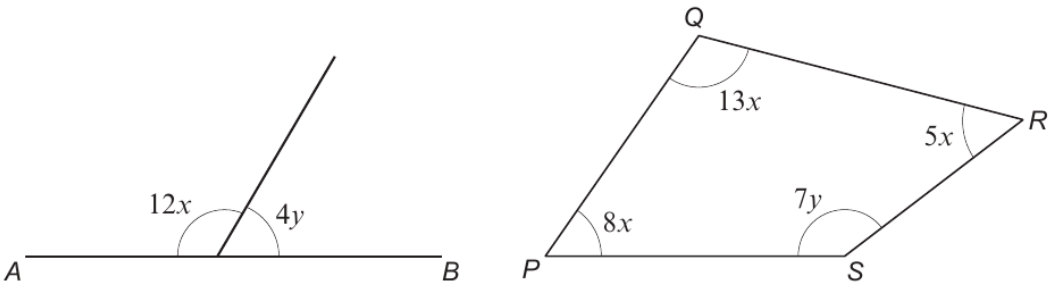
21. The grouped frequency table below shows data for 32 values of t.
One of the frequencies in the table is represented by a.

t	Frequency
$20 \leqslant t < 30$	2
$30 \leqslant t < 40$	8
$40 \leqslant t < 50$	4
$50 \leqslant t < 60$	a
$60 \leqslant t < 70$	3
$70 \leqslant t < 80$	5

Find the estimated mean value of t for the 32 values. [5]

Examiner only

22. *AB* is a straight line.
PQRS is a quadrilateral.
Each angle is given in terms of x or y.



Diagrams not drawn to scale

Use an algebraic method to find the value of x and the value of y. [6]

x = ... and y = ...

END OF PAPER

Examiner only

1. Solve each of the following equations.

(a) $\frac{x}{5} = 20$ [1]

(b) $7m + 3 = 31$ [2]

2. (a) Evaluate 55% of 42·8. [2]

(b) Which one of the following is **not** equal to a recurring decimal?
Circle the correct answer. [1]

$\frac{2}{11}$ $\frac{2}{3}$ $\frac{3}{16}$ $\frac{7}{9}$ $\frac{5}{6}$

Examiner only

2. (a) Which of the following is the nearest value to 488 grams?
Circle the correct answer. [1]

0·5 kg 500 kg 50 kg 5 tonnes 0·05 kg

(b) Circle the correct answer for the following. [1]
15 miles is approximately equal to

1500 m 24 km 15 km 2·4 km 3000 m

3. The nth term of a sequence is given by $5n - 1$.

Calculate the sum of the first three terms.
You must show all your working. [3]

Sum of the first three terms = ...

Examiner only

11. Ifan has chosen four odd numbers.
Some of the numbers are the same and some of them are different.
Ifan's numbers are all less than 10.

Both the mode and the mean of Ifan's numbers are 7.

What numbers has Ifan chosen? [3]

Ifan's numbers are ☐ ☐ ☐ ☐

12. Evaluate each of the following.

(a) $0{\cdot}8 \times 0{\cdot}25$ [1]

(b) $13{\cdot}4 - 2{\cdot}96$ [1]

Examiner only

2. (a) Write down the value of the 3 in the number 532 719. [1]

(b) Add the numbers 865 and 92 and 407. [1]

(c) Subtract 647 from 1029. [1]

3. (a) Which is the best metric unit for measuring the mass of a pencil?
Circle the correct answer. [1]

kilograms grams tonnes centimetres milligrams

(b) Which is the best metric unit for measuring the distance from Swansea to Wrexham?
Circle the correct answer. [1]

millimetres metres kilometres litres kilograms

Examiner only

4. (a) Draw $\hat{DEF} = 57°$.
The line EF has been drawn for you. [1]

(b) Dafydd draws an acute angle.
The angle is the same size as half a right angle.
What is the size of the acute angle? [2]

.....

The size of the acute angle is ..... °

3300U101
05

5. (a) Write 25 378 correct to the nearest 100. [1]

.....

(b) Write down the next number in this sequence. [1]

13, 25, 37, 49, ...

.....

(c) Divide 10 kg by 4.
Give your answer in grams. [2]

.....

.....

.....

Answer is ..... g

Examiner only

11. Steffan uses 654 kWh of electricity in a three-month period.

Electricity costs £0.30 per kWh.
The standing charge for the three-month period is £54.
Steffan has to pay VAT at 5% on the **total** cost.

Calculate Steffan's electricity bill.
You must show all your working. [5]

END OF PAPER