| Name | Date started | Target end date |
| --- | --- | --- |
| | | |

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

Compound measures linking two base quantities: speed = distance/time, density = mass/volume, and pressure = force/area. Includes unit conv

REVISE
.wales

# 3.11 — Compound measures — speed, density & flow rates

## *Spec 3.5.8, 3.5.9, 3.5.10 — Unit 3 (calculator allowed)*

*Compound measures linking two base quantities: speed = distance/time, density = mass/volume, and pressure = force/area. Includes unit conversions and the formula-triangle technique. Sourced from legacy WJEC GCSE Mathematics and Mathematics-Numeracy Higher calculator-allowed papers, organised for revision under the 2025 spec.*

2025 SPECIFICATION

**Estimated time for entire question pack: ~3 hours 38 minutes**

*Derived from the GCSE Higher pace of **~1.5 min/mark** (145 marks across 34 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 3 is the calculator-allowed paper).*

# Compound measures — speed, density & flow rates — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 3: calculator-allowed.

## Speed 3.5.8

- Use $\text{speed} = \text{distance}/\text{time}$ and rearrangements.
- Convert between m/s and km/h.
- Distinguish average speed from instantaneous speed.

## Density 3.5.9

- Use $\text{density} = \text{mass}/\text{volume}$ and rearrangements.
- Quote units (g/cm$^3$ or kg/m$^3$) and convert as needed.
- For composite objects, compute total mass or total volume first.

## Pressure & other compound measures 3.5.10

- Use $\text{pressure} = \text{force}/\text{area}$ with consistent units.
- Recognise compound units (Pa, N/m$^2$, kg/m$^3$).
- Always state units alongside numerical answers.


Crib sheet »

# Compound measures — speed, density & flow rates in one page

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

## Speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Rearrange: $\text{distance} = \text{speed} \times \text{time}$, $\text{time} = \frac{\text{distance}}{\text{speed}}$.

Common units: m/s, km/h, mph.

## Density

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

$\text{mass} = \text{density} \times \text{volume}$, $\text{volume} = \frac{\text{mass}}{\text{density}}$.

Common units: g/cm$^3$, kg/m$^3$.

## Pressure

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Common units: Pa = N/m$^2$, N/cm$^2$.

Pressure increases as area decreases for the same force — that's why drawing pins have a sharp point.

## Formula triangle

For $a = b \times c$ or $a = b/c$, draw a triangle with the products on the bottom and the quotient on top.

Cover the quantity you want; the layout of the others shows the formula.

## Unit conversions for speed

m/s to km/h: multiply by $3.6$.

km/h to m/s: divide by $3.6$.

$1$ hour $= 3600$ s; $1$ km $= 1000$ m.

$15$ m/s $= 15 \times 3.6 = 54$ km/h.

## Unit conversions for density

$1$ g/cm$^3$ $= 1000$ kg/m$^3$.

Density of water $\approx 1$ g/cm$^3$ $= 1000$ kg/m$^3$.

Always check that mass and volume are in matching units before dividing.

## Worked example — density

A cylinder of radius $2.3$ cm and height $5$ cm has mass $423.1$ g.

Volume $= \pi(2.3)^2(5) \approx 83.10$ cm$^3$.

Density $= 423.1/83.10 \approx 5.09$ g/cm$^3$.

## Common traps

- Mixing units (cm and m, g and kg) in the same calculation.
- Inverting the formula — check which is on top.
- Forgetting to square or cube units when converting areas/volumes.
- Misreading the question: average speed vs instantaneous speed.

Examiner only

**2.** The $n$th term of a sequence is given by $n^2 + 7$.

Write down the first three terms of this sequence. [2]

.....

.....

.....

1st term = ..... 2nd term = ..... 3rd term = .....

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

*(a)* $x^3 \times x^6 =$ [1]

$x^{36}$ $x^{0.5}$ $x^2$ $x^9$ $x^{18}$

.....

*(b)* $(7x - 5y) - (3x + 2y) =$ [1]

$4x - 3y$ $4x - 7y$ $4x + 3y$ $-4x + 7y$ $-4x - 7y$

.....

.....

*(c)* A car travels $x$ miles in 30 minutes.
Its average speed in miles per hour is [1]

$\frac{x}{2}$ $\frac{x}{30}$ $2x$ $\frac{2}{x}$ $30x$

.....

.....

Examiner only

**3.** The wire window guard shown below is to be made.

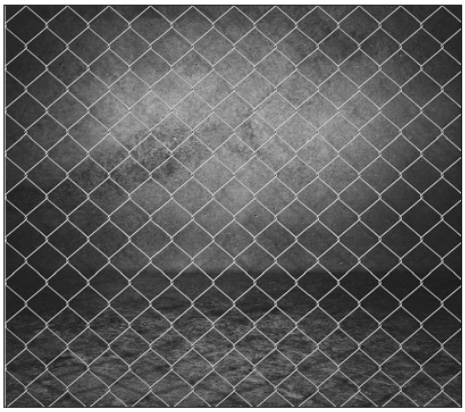

*Diagram not drawn to scale*

The length of the sides of each small wire square shown is 3·3 cm.

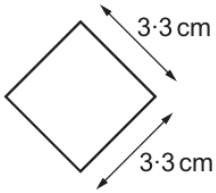


*Diagram not drawn to scale*

Llinos considers the length of the diagonal of each small square.

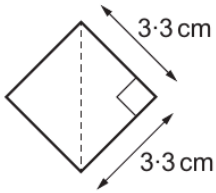


*Diagram not drawn to scale*

She says,

> The height of the window guard is equal to 9·5 diagonals of the square.
> The width of the window guard is equal to 11 diagonals of the square.

Examiner only

(a) Calculate the length of the diagonal of a small square.
Give your answer correct to 1 decimal place. [3]

(b) Calculate the area of the **window guard**.
You must show all your working. [3]

Examiner only

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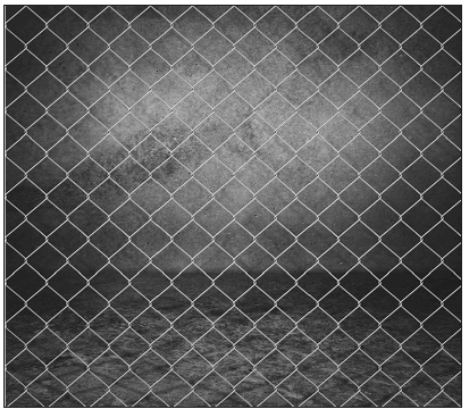

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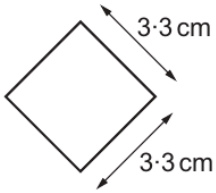


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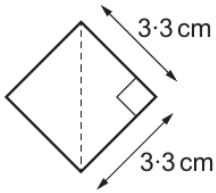


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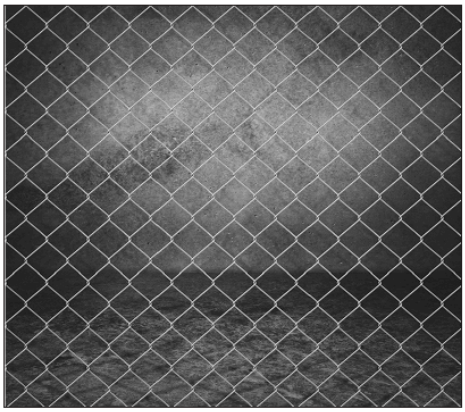

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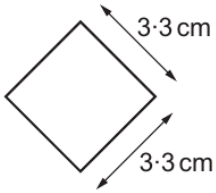


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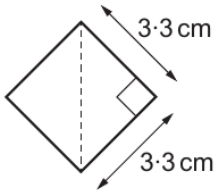


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Examiner only

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Give your answer correct to 1 decimal place. [3]

(b) Calculate the area of the **window guard**.
You must show all your working. [3]

Examiner only

**7.** Here is some information from a 2014 geographical journal:

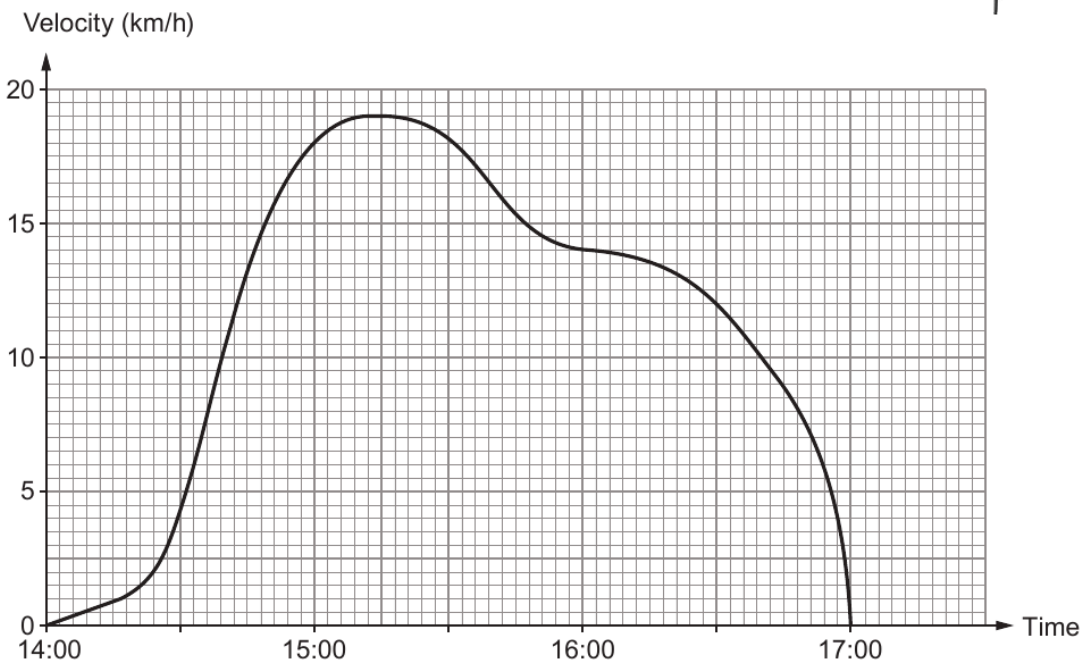
- Population of the UK: $6{\cdot}5 \times 10^7$, correct to the nearest 1 000 000
- Area of the UK: 244 000 $km^2$, correct to the nearest 1000 $km^2$

Using these figures, calculate the greatest possible value for the population density of the UK, in population per $km^2$. [4]

Examiner only

**7.** Siân went for a ride on her bike.

She started her ride at 14:00.
The graph below shows information about her bike ride.




*(a)* During which quarter-hour period was Siân's acceleration the greatest? [1]

*(b)* At about what time did Siân stop accelerating? [1]

*(c)* Siân usually finds cycling at a velocity of 18 km/h very comfortable.
Express 18 km/h in metres per second. [2]

Examiner only

*(d)* Using her velocities at 14:00, 15:00 and 16:00, calculate an estimate for the total distance Siân travelled **between 14:00 and 16:00**. [3]

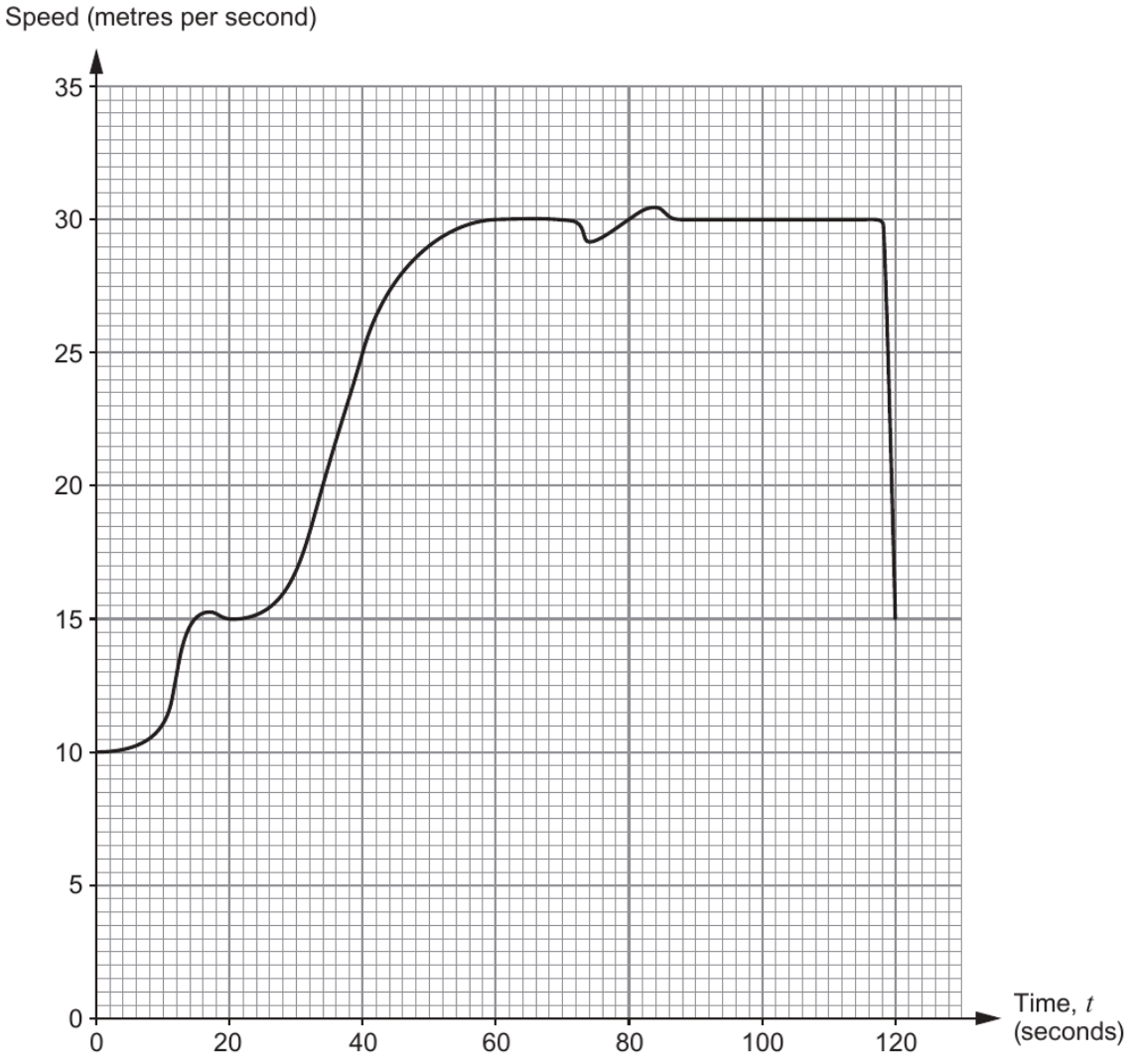
Distance travelled ..... km

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

Siân estimated the distance she travelled between 16:00 and 17:00 as **5 miles**.
Is Siân's estimate reasonable?
You must justify your answer and show your working. [3 + 2 OCW]

Examiner only

**10.** The graph below shows a 120-second section of Iestyn's car journey to work this morning.




*(a)* (i) At $t$ = 50 seconds, estimate the acceleration of Iestyn's car in m/s$^2$.
Leave your answer as a fraction. [3]

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Examiner only

(ii) At another time, Iestyn calculated the acceleration of the car to be $0{\cdot}2\dot{4}\,m/s^2$.
Write this recurring decimal as a fraction. [2]

*(b)* (i) Calculate an estimate of the distance travelled by Iestyn's car in the first 80 seconds of his journey.
You must consider the speed of the car when $t$ = 0, 20, 40, 60 and 80 seconds. [4]

(ii) Hence, calculate an estimate of the average speed of Iestyn's car for this entire 120-second section of his car journey.
Give your answer in m/s. [4]

Examiner only

**2.** *(a)* Megan and Rhodri both set out at the same time from home to go to the swimming pool.
Rhodri travels by car.
Megan cycles straight through the park.

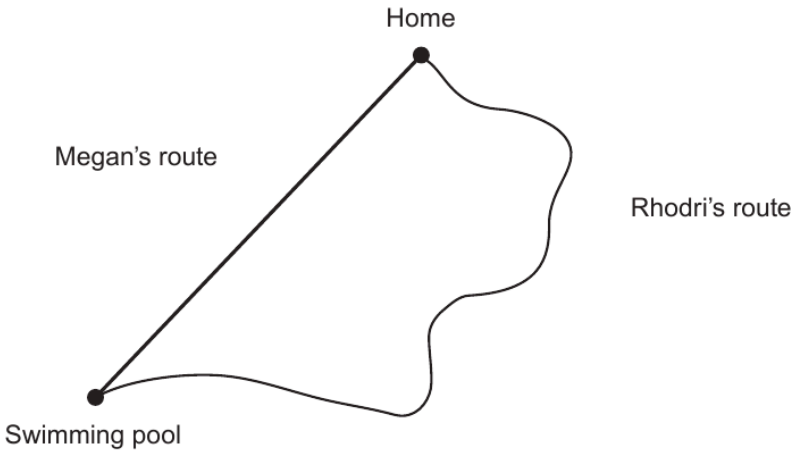


*Diagram not drawn to scale*

Rhodri's journey by car is 5·5 miles.
His average speed for the journey is 22 mph.

Megan's average speed on her bike is 12 mph.
Megan arrives at the swimming pool 5 minutes before Rhodri.

Calculate the distance Megan cycles.
Give your answer in miles.
You must show all your working. [5]

Distance Megan cycles is ..... miles

Examiner only

(b) Gary travelled a distance of 231 km in 3 hours and 30 minutes.
Calculate Gary's average speed in km/h.
Circle your answer. [1]

0·015 1·1 66 70 77

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Examiner only

**3.** Sara is carrying out a survey of the three villages, Cwm, Allthir and Gwyndir.
The diagram below shows the positions of the three villages.

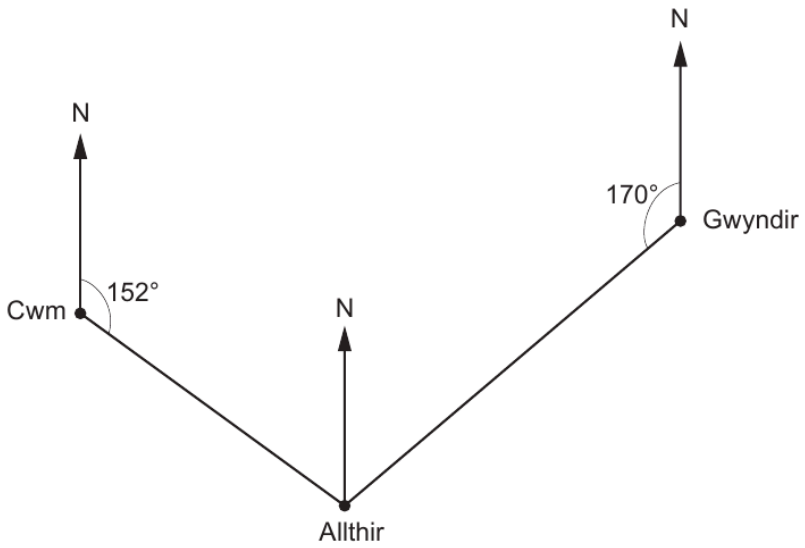


*Diagram not drawn to scale*

*(a)* What is the bearing of Allthir from Gwyndir?
Circle your answer. [1]

010° 170° 180° 190° 200°

*(b)* What is the bearing of Cwm from Allthir?
Circle your answer. [1]

028° 152° 242° 332° 352°

Examiner only

(c) The area of the land covered by the three villages is 200 km$^2$.
The total population of the three villages is 8400 people.

(i) What is the population density of the three villages?
Give your answer in population/km$^2$. [2]

(ii) The populations of Cwm, Allthir and Gwyndir are in the ratio 3 : 4 : 5.
Calculate the population of Gwyndir. [2]

Examiner only

**9.** Matas knows the following information about the amount of fuel his car uses.

| Speed | Miles per gallon |
|---|---|
| 30 mph | 54 |
| 50 mph | 60 |
| 70 mph | 50 |

During one journey, Matas drove at 50 mph for part of the time and at 70 mph for the rest of the time.

He drove for 3 hours at a speed of 50 mph.
For the whole journey, Matas used 4·6 gallons of fuel.

For how long did Matas travel at 70 mph?
You must show all your working. [6]

Examiner only

**2.** Emyr has set his lawn mower to work at a constant speed of 2000 m per hour.
He walks a distance of 300 m when he cuts his lawn.

*(a)* (i) Use this information to calculate how long Emyr takes to cut his lawn.
Give your answer in minutes. [2]

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It takes Emyr ..... minutes.

(ii) What assumption have you made? [1]

.....

.....

(iii) What impact would this have on the time you calculated in answering *(a)*(i)? [1]

.....

*(b)* Emyr cuts his lawn 25 times a year.
He uses 4·5 litres of petrol in his lawn mower each year.

How much petrol does the lawn mower use for every 100 metres that Emyr walks?
Give your answer in litres. [3]

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Examiner only

(c) Petrol costs £1.30 per litre.

Emyr says,
"The petrol for my lawn mower costs me approximately 60p per pint."

Is Emyr correct?
You must show all your working. [3]

Yes ☐ No ☐

Examiner only

**5.** Cycle frames are made from steel, aluminium or carbon fibre.
The table below gives the density of steel, aluminium and carbon fibre.

| Material | Density (g/cm$^3$) |
|---|---|
| Steel | 7·8 |
| Aluminium | 2·7 |
| Carbon fibre | 1·6 |

Owain has a cycle frame made from aluminium.
His cycle frame has a mass of 9450 g.

*(a)* Calculate the volume of aluminium in Owain's cycle frame.
Give your answer in cm$^3$. [3]

Volume of aluminium in Owain's cycle frame is ..... cm$^3$

*(b)* Bethan has a cycle frame that is identical to Owain's cycle frame.
However, her cycle frame is made from carbon fibre.
Calculate the mass of this frame.
Give your answer in grams. [3]

Mass of this cycle frame is ..... g

**4.** A helicopter pilot is planning a route from Milford Haven to Ruabon and then on to Swansea.


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

The plan for the flight is shown below.

| Journey | Average speed | Time |
|---|---|---|
| Milford Haven to Ruabon | 90 mph | 1 hour 20 minutes |
| Ruabon to Swansea | 80 mph | 1 hour 15 minutes |

Examiner only

Calculate the total distance of the flight.
Give your answer in miles.
You must show all your working. [4 + 2 OCW]

(b) On average, the helicopter uses 0·4 gallons of fuel per minute.

Remember: 1 gallon = 4·55 litres

Use this information to calculate how many litres of fuel the helicopter would be expected to use for the flight planned in *(a)*.
You must show all your working. [5]

Fuel = ..... litres

Examiner only

**7.** The table below shows the approximate land area and population for 5 countries in 2014.

| Country | Approximate land area, $km^2$ | Approximate population |
|---|---|---|
| Argentina | 2800000 | 40000000 |
| Austria | 84000 | 8400000 |
| Canada | 10000000 | 34000000 |
| Pakistan | 800000 | 170000000 |
| United Kingdom | 240000 | 62000000 |

*(a)* Which of the 5 countries had a population density of approximately 100 people per $km^2$? Circle your answer. [1]

Argentina Austria Canada Pakistan United Kingdom

*(b)* Which of these countries had the greatest population density? Circle your answer. [1]

Argentina Austria Canada Pakistan United Kingdom

*(c)* Which of these countries had a population density that is approximately 4 times the population density of Canada? You must show all your working. [2]

Examiner only

**12.** *(a)* Factorise $81p^2 - 1$. [2]

*(b)* Factorise $7t^2 + 19t - 6$. [2]

**13.** A car travels 300 km, measured correct to the nearest 5 km.
It travels this distance in 6 hours, measured correct to the nearest hour.

Calculate the least possible average speed of the car.
Give your answer in km/h, correct to 2 decimal places. [3]

Examiner only

**7.** A solid object is made by drilling a cylindrical hole of radius 4 cm through a cuboid measuring 20 cm by 15 cm by 10 cm as shown below.

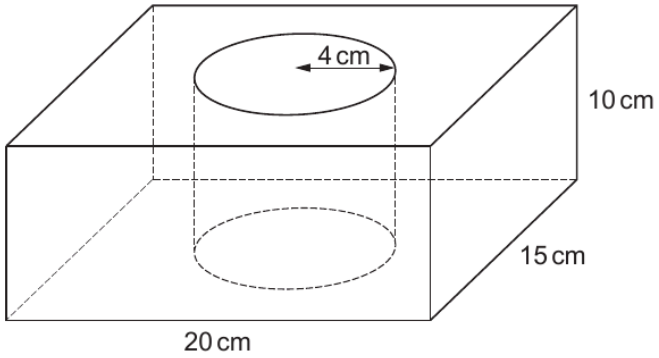



*Diagram not drawn to scale*

*(a)* Calculate the volume of the object.
Give your answer in $cm^3$. [3]

Volume = ..... $cm^3$

Examiner only

**1.** A solid metal cylinder has a radius of 2·3 cm and a height of 5 cm.

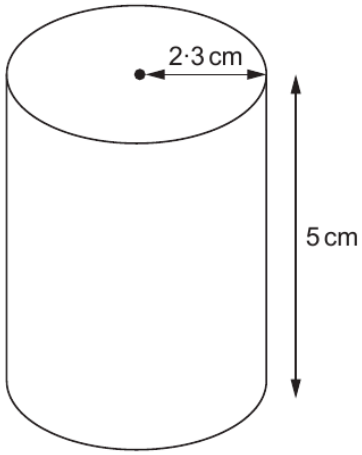



*Diagram not drawn to scale*

The mass of the cylinder is 423·1 g.

Find the density of the metal.
Give your answer in g/cm$^3$. [4]

Examiner only

**4.** (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]

Examiner only

**8.** Two cruise ships, The Explorer and The Magellan, leave the same port at 06:30.
The Explorer sails at a speed of 30 km/h on a bearing of 051°.
The Magellan sails at a speed of 35 km/h.
The angle between the courses of the two ships when they set sail is 49°.

(a) At 11:00, The Magellan comes to a stop due to engine failure.
The diagram below shows the positions of the two ships at 11:00.

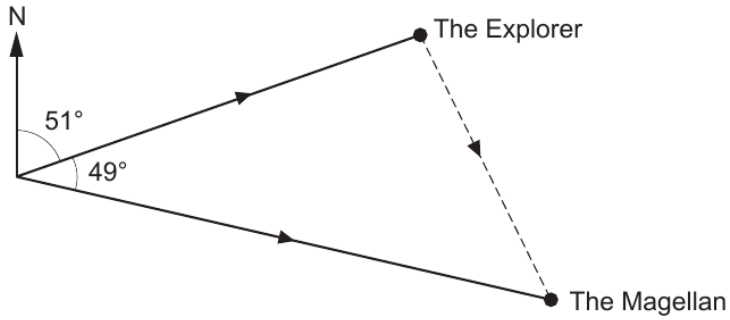



*Diagram not drawn to scale*

Immediately, The Explorer then heads directly towards The Magellan to pick up its passengers.
It travels at a speed of 30 km/h.
Calculate the time, to the nearest minute, when The Explorer will reach The Magellan.
[7]

Examiner only

Time when The Explorer will reach The Magellan is .....

(b) Calculate the bearing The Explorer has to sail on from 11:00 onwards to arrive at The Magellan. [5]

**END OF PAPER**

Examiner only

**2.**

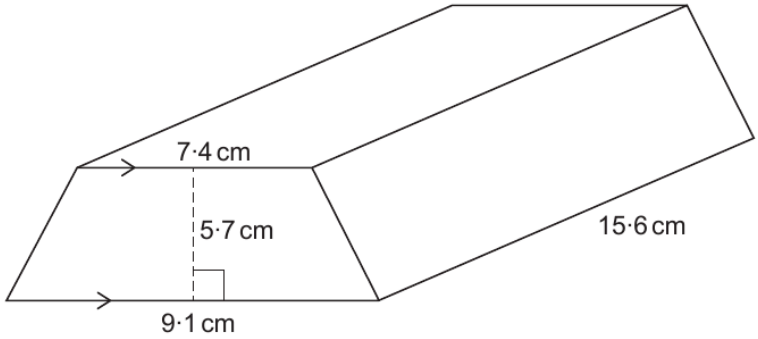



*Diagram not drawn to scale*

(a) Find the volume of the solid prism shown above. [3]

(b) The solid prism is made of gold.
Gold has a density of 19·3 g/cm$^3$.

Calculate the mass of the prism.
Give your answer in **kilograms**. [3]

Mass of the prism = ..... **kg**

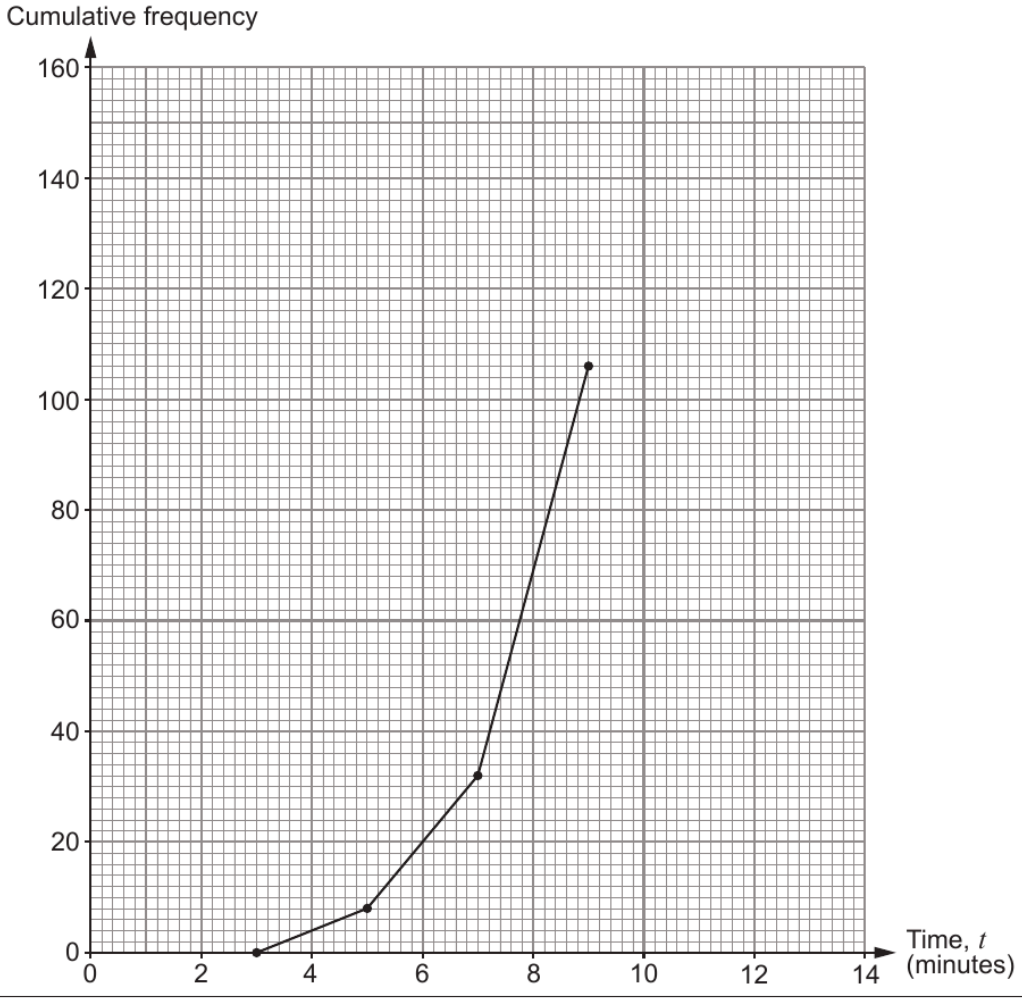
Examiner only

**4.** 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

**8.** On average, Hywel's car travels a distance of 11 miles **per litre** of petrol used.
The petrol tank in his car can hold 70 **pints** of petrol.
At Hywel's local garage, it would cost him £56 to fill the tank from empty.

Hywel's petrol tank is $\frac{1}{10}$ full.
At his local garage, he spends £28 on petrol.
Calculate the distance Hywel can travel in the car before the tank is empty.
You must show all your working. [6]

Distance Hywel can travel before the tank is empty = ..... miles

Examiner only

**9.** Akago is a food delivery company.

(a) 5 Akago delivery vans can deliver food to 100 houses in 4 hours.

Akago wants to:
- increase the number of deliveries to 240 houses
- shorten the total delivery time to 3 hours.

Calculate the number of delivery vans that would be needed to deliver food to 240 houses in 3 hours.
You can assume that all vans deliver food to all the houses at the same rate. [3]

Number of delivery vans needed = .....

Examiner only

(b) The design of the company's logo is based on the letter **A**.
It is made from rectangles, connected by sectors of circles.
The company prints its logo on its delivery boxes.
The logo is shown below.

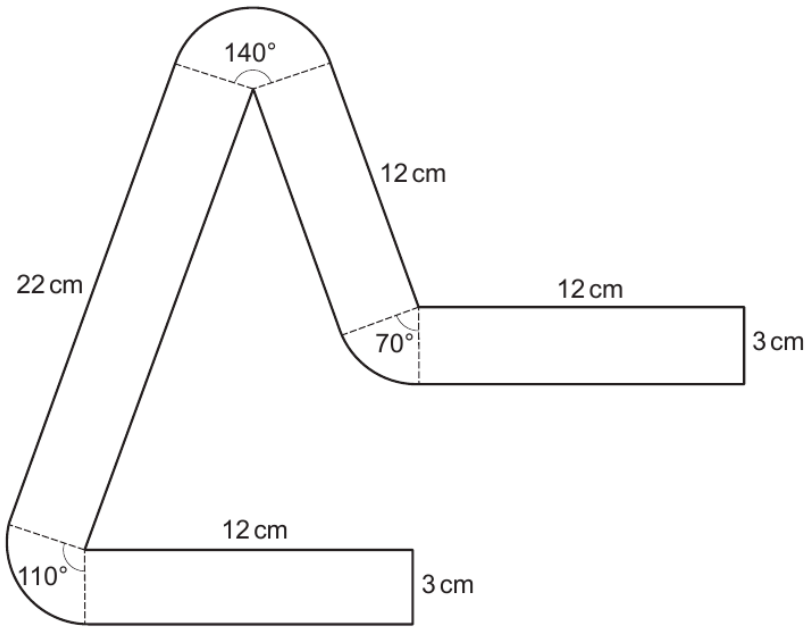



*Diagram not drawn to scale*

Calculate the area of the logo that is printed on the company's delivery boxes.
Give your answer in terms of $\pi$ in its simplest form. [6]

Examiner only

Area of the logo = ..... $cm^2$

(c) Akago has decided to add two squares to its logo, to represent two stacked food boxes being delivered to your door.

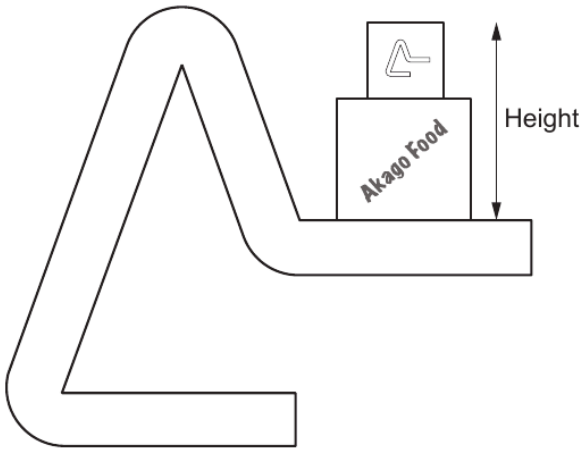



*Diagram not drawn to scale*

The larger square has an area of 45 $cm^2$.
The smaller square has an area of 5 $cm^2$.
Calculate the total height of the two stacked food boxes, as shown in the diagram.
Give your answer in the form $a\sqrt{b}$, where a and b are integers, and b is as small as possible. [3]

Examiner only

**5.** (a) The area of Wales is 20 735 km$^2$.

The table below gives the population of Wales in 1977, 1998 and 2015.

| **Year** | 1977 | 1998 | 2015 |
|---|---|---|---|
| **Population** | 2·8 million | 2·9 million | 3·1 million |

(i) What was the increase in the population of Wales between 1977 and 1998? Circle your answer. [1]

$1 \times 10^3$ $1 \times 10^4$ $1 \times 10^5$ $1 \times 10^6$ $1 \times 10^7$

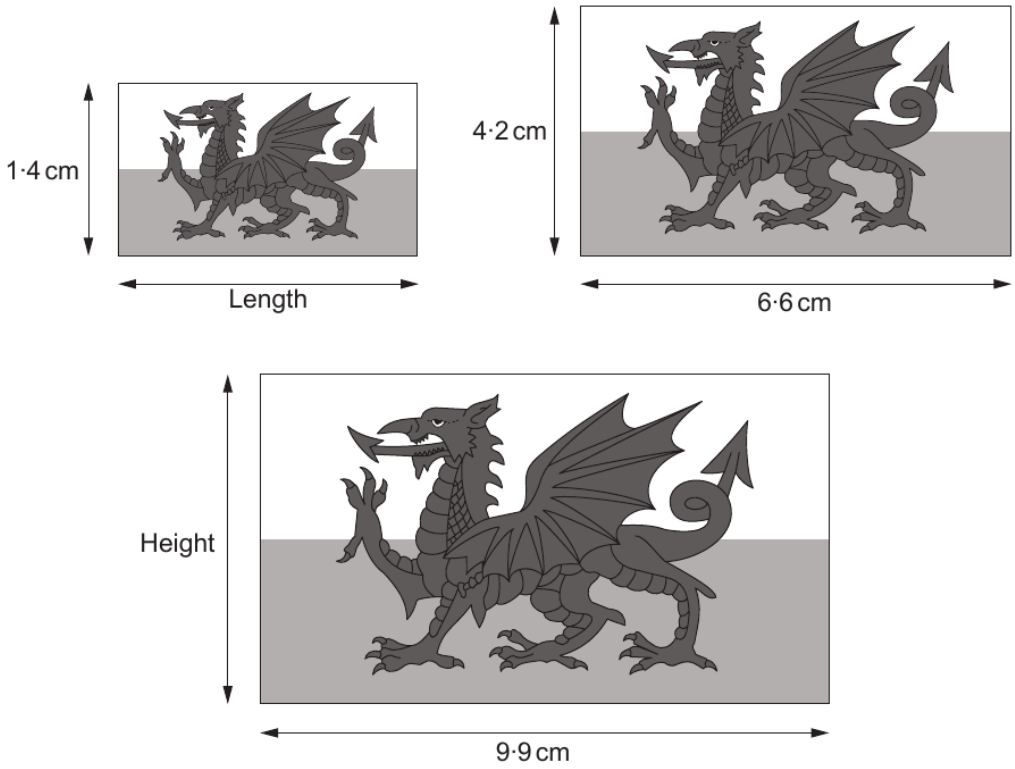
(ii) Estimate the population density of Wales in 2015. [3]

Population density of Wales in 2015 was ..... people / km$^2$

(b) Cardiff is the largest city in Wales.
In 2018, the population of Cardiff was approximately 360 000.
The population of Cardiff increased by 20% from 1991 to 2018.
Calculate the population of Cardiff in 1991. [3]

Examiner only

(c) DraigYma prints Welsh flags onto stickers.
Three of their mathematically similar Welsh flag stickers are shown below.




*Diagrams not drawn to scale*

Calculate the missing length and height in the diagrams. [4]

Length is ..... cm Height is ..... cm

Examiner only

**7.** (a) Express 0·0057 in standard form. [1]

(b) Calculate the value of $\frac{2\times10^{4}}{5\times10^{-3}}$.

Give your answer in standard form. [2]

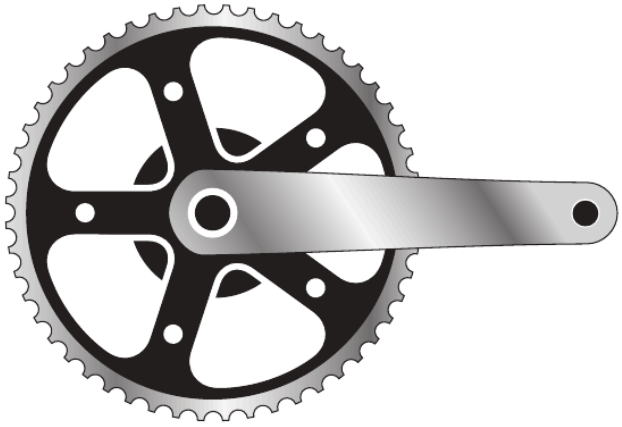
**8.** A car travels a distance of $x$ miles in 2 hours.
In the next hour, it travels a further distance of 36 miles.

Its average speed for the whole journey is 42 mph.

Calculate the value of $x$.
You must show all your working. [3]

Examiner only

**9.** (a) Geraint has bought a new front cog for his bike.



The cog has a mass of 150 g, **correct to the nearest 10 g**.
The cog has been made from a metal that has a density of 3 g/cm$^3$, **correct to the nearest g/cm$^3$**.
Calculate the maximum possible volume of the cog. [3]

Examiner only

(b) This picture shows part of Geraint's bike.

A simplified diagram of the cogs and the chain is shown below.

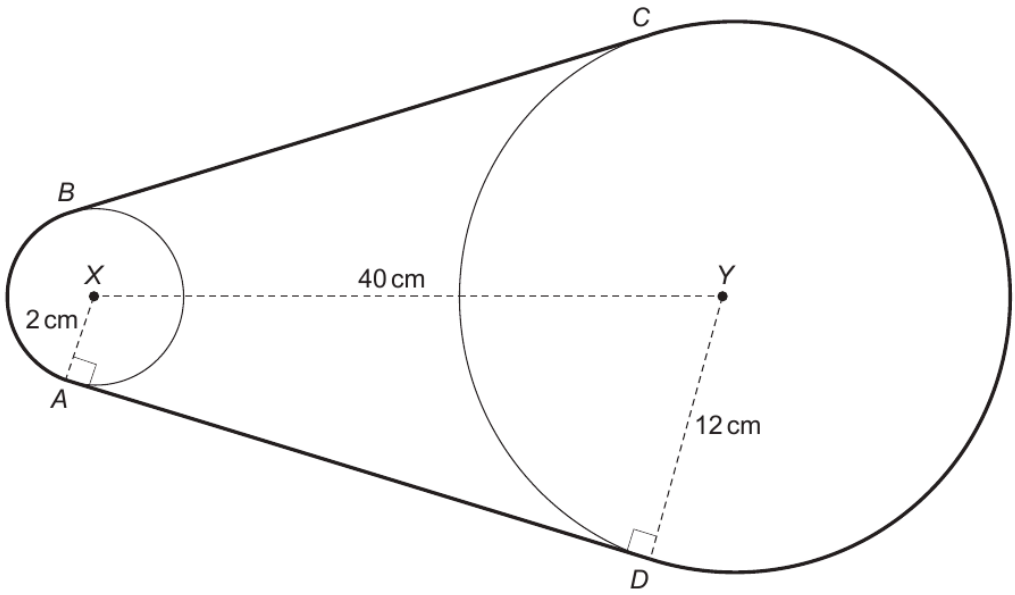



*Diagram not drawn to scale*

*X* and *Y* are the centres of the cogs and *XY* is a line of symmetry.
*BC* and *AD* are straight sections of the chain.

The larger cog has a radius of 12 cm.
The smaller cog has a radius of 2 cm.

(i) Use Pythagoras' theorem to show that the length of *AD* is $10\sqrt{15}$ cm.
You must show all your working. [3]

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Examiner only

(ii)

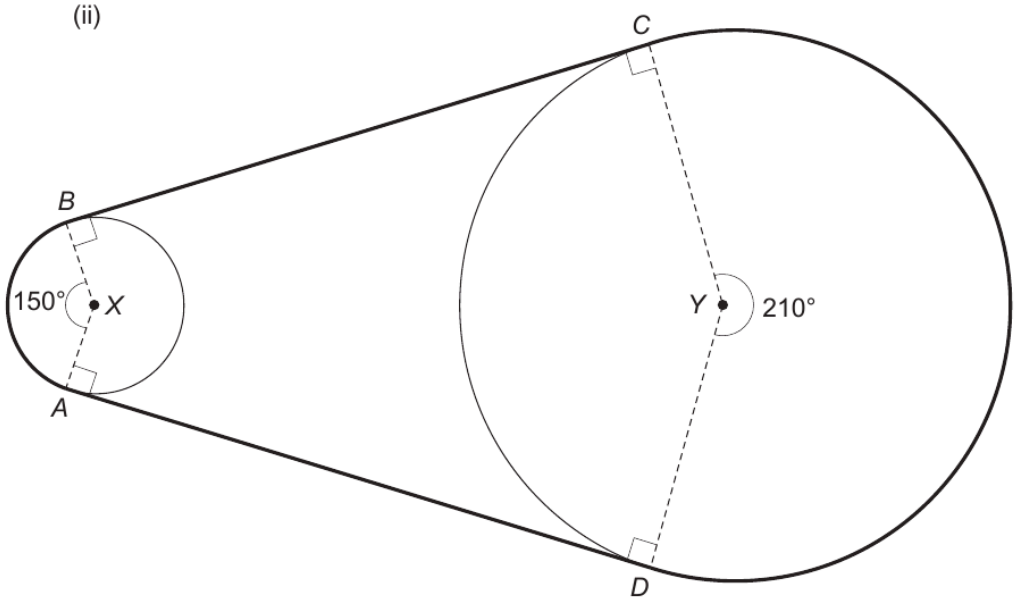


*Diagram not drawn to scale*

$A\hat{X}B$ = 150°, reflex $C\hat{Y}D$ = 210°, $BC = AD = 10\sqrt{15}$ cm.

Calculate the total length of the chain.

Give your answer in the form $a\sqrt{15} + b\pi$, where $a$ and $b$ are rational numbers. [5]

Examiner only

**10.** 7 water pumps can fill a swimming pool in 12 hours.
These 7 water pumps work together at the same rate.

When the pool is empty, the 7 pumps are turned on.
After working for 3 hours, 2 of the pumps are turned off.
The other pumps carry on working until the swimming pool is full.

Calculate how long in total it takes for the swimming pool to be filled.
Give your answer in hours and minutes. [4]

Total time taken for the pool to be filled = ..... hours ..... minutes

**END OF PAPER**

Examiner only

**1.** (a) Steffan always leaves his fridge-freezer turned on.
His fridge-freezer uses electricity costing £2.31 per week.
Electricity costs £0.30 per kWh.
Calculate the number of kWh of electricity Steffan's fridge-freezer uses **per day**.
You must show all your working. [3]

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Examiner only

(b) Steffan is thinking of buying the fridge-freezer shown below.

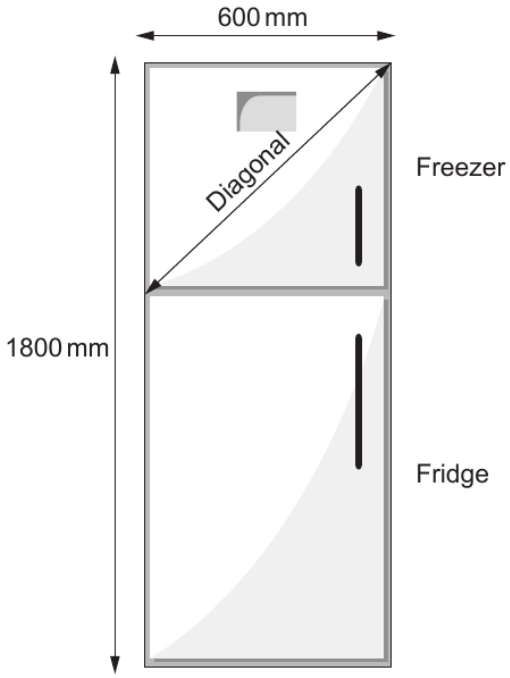



*Diagram not drawn to scale*

Steffan needs to check that the **freezer** compartment of this fridge-freezer has enough room.

The height of the freezer door is $\frac{2}{5}$ of the total height of the fridge-freezer.

Calculate the length of the **diagonal** of the freezer door.
Give your answer in millimetres.
You must show all your working. [5]

Examiner only

**4.** A cyclist travels for 2 hours at an average speed of x miles per hour.
She then travels for a further 3 hours at an average speed of $(x+6)$ miles per hour.
She travels a total distance of 78 miles.

Form an equation, in terms of x, to represent the total distance she travels.
Solve your equation and use your solution to complete the statements below. [6]

First, the cyclist travels for 2 hours at an average speed of ..... miles per hour.

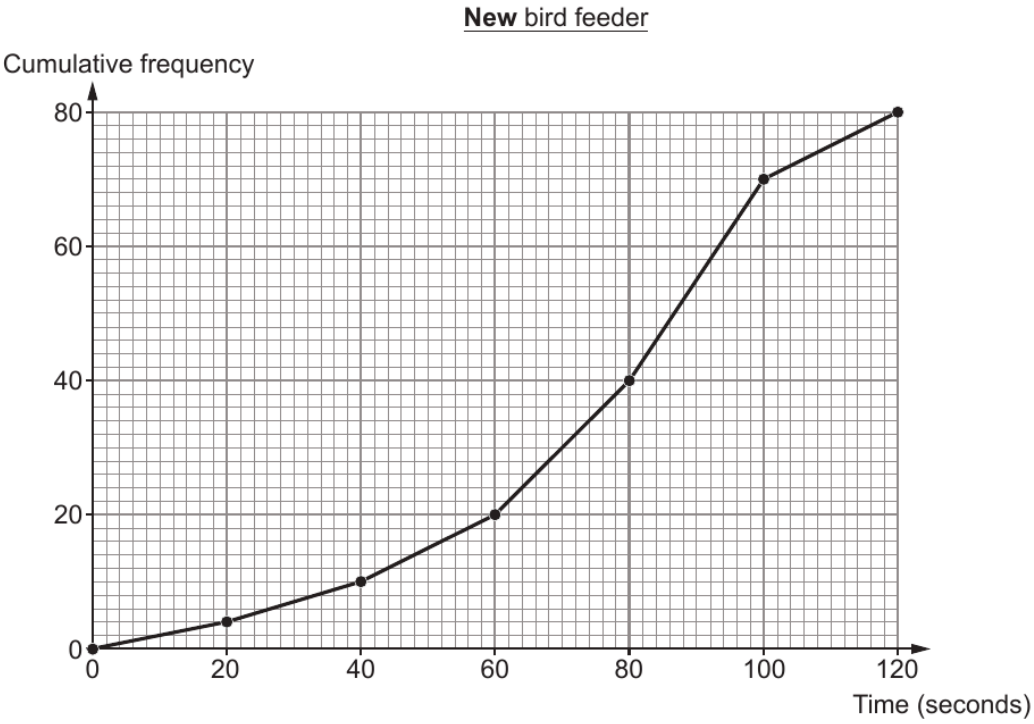
Then, she travels for a further 3 hours at an average speed of ..... miles per hour.

**4.** Aderyn is a company that makes bird feeders.

Squirrels often try to steal food from bird feeders.

To make this more difficult, Aderyn has designed a **new** bird feeder. Aderyn tests its new feeder to check how long it takes squirrels to reach the food inside.

The results are displayed in the cumulative frequency diagram below.




(a) Aderyn has the following information about the time it took squirrels to reach the food in its **original** bird feeder.

| **Original** bird feeder | |
|---|---|
| Modal group | 60 to 80 seconds |
| Median time | 75 seconds |
| Interquartile range | 20 seconds |

Examiner only

Aderyn compared the times squirrels take to reach the food in the original bird feeder and the times they take to reach food in the new bird feeder.

(i) Complete this sentence:

'The modal group for the new bird feeder is between ..... and ..... seconds.'

Does the modal group for the new bird feeder imply that there is an improvement in the times? [1]

Yes ☐ No ☐

(ii) Use the cumulative frequency diagram and the table to give the best estimate to complete each of the following sentences.

I. 'The difference between the median times is ..... seconds.' [1]

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II. 'The difference between the interquartile ranges of the times is ..... seconds.' [2]

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(b) Use the cumulative frequency diagram to give the best estimate to complete the following sentence. [3]

'20% of the squirrels took ..... seconds or more to reach the food in the new bird feeder.'

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Examiner only

(c) The population density of grey squirrels in forests depends on the variety of tree that grows there.

| Variety of tree | Typical population density of grey squirrels **per km$^2$** |
|---|---|
| Oak | 1200 |
| Chestnut | 100 |
| Pine | 45 |

Rhian says,

I know that Maesgwyn forest has only one variety of tree: oak, chestnut or pine.

Maesgwyn forest covers an area of 21 500 m$^2$.
There are 24 grey squirrels living in Maesgwyn forest.

From this information, which variety of tree is most likely to be found in Maesgwyn forest?

You must show working to support your answer. [3]

Oak ☐ Chestnut ☐ Pine ☐

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Examiner only

**5.** (a) Delia invests £4000 in an account that pays 3% compound interest per annum. She does not withdraw money or make any other payments into her account.

How much will Delia have in her account after **two years**? [3]

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**Amount** in Delia's account after two years £ .....

(b) Delia bought a gold bracelet at a car boot sale a few years ago.

(i) Delia's bracelet has increased in value by 40%. Her gold bracelet is now worth £42.

Calculate how much Delia paid for the bracelet in the car boot sale. [2]

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Delia paid £ .....

Examiner only

(ii) The density of the gold in Delia's bracelet is $20\,g/cm^3$.
The bracelet has a mass of $6\times10^{-3}$ **kilograms**.

Calculate the volume of Delia's bracelet.
Give your answer in $cm^3$. [3]

Examiner only

**8.** Convert $3 \cdot 2 \times 10^4$ metres into **miles**. [3]

$3 \cdot 2 \times 10^4$ metres is ..... miles