Name	Date started	Target end date

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

Maps, scales and bearings: reading scale ratios, converting map distance to real distance, measuring three-digit bearings from North, and interpreting

REVISE
.wales

F3.02 — Maps, scale, bearings, plans & elevations

Spec 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5, 3.3.6, 3.3.7 — Unit 3 (calculator allowed)

Maps, scales and bearings: reading scale ratios, converting map distance to real distance, measuring three-digit bearings from North, and interpreting plan and elevation views of 3-D shapes. 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: ~38 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (25 marks across 11 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).

Maps, scale, bearings, plans & elevations — what the new spec asks

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

Scale drawings 3.3.1

- Interpret scale of form 1:n.
- Convert map distance to real-life distance.
- Convert real-life distance to map distance.

Bearings 3.3.4

- Measure clockwise from North.
- Always state as three digits.
- Find back-bearing by adding/subtracting 180°.

Plans and elevations 3.3.6

- Draw plan and elevations from a 3-D shape.
- Identify a solid from its views.
- Use a square grid to keep lengths accurate.

Exam strategy 3.3

- Show the scale calculation as a ratio.
- Use a sharp pencil and ruler for accuracy.
- Tolerance is usually ±2° or ±2 mm — measure carefully.

Crib sheet »

Maps, scale, bearings, plans & elevations in one page

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

Scale 1:n

1 cm on the map = n cm in real life.

1:50 000 ⇒ 1 cm = 50 000 cm = 500 m = 0.5 km.

Converting map ↔ real

$$\text{real} = \text{map} \times \text{scale}$$
$$\text{map} = \text{real} \div \text{scale}$$

Always check units (cm, m, km) match before multiplying.

Bearings

Measured **clockwise from North**, always given as **three digits**.

Due East = 090°. South-West = 225°. North = 000° or 360°.

Drawing a bearing

1. Mark North line at the start point.
2. Measure clockwise with a protractor.
3. Draw the line and mark the new point.

Plan & elevations

Plan = view from *directly above*.

Front elevation = view from the front.

Side elevation = view from the side.

Common traps

- Forgetting to convert cm to m or km.
- Two-digit bearing instead of three.
- Drawing the elevation in 3-D instead of 2-D.

Examiner only

14. *(a)* Simplify the expression $15x - 2y - 7x - 4y$. [2]

(b) Solve the equation $2m - 7 = 12$. [2]

(c) Calculate the value of $5f + 3g$ when $f = -4$ and $g = 7$. [2]

Examiner only

19. *(a)*

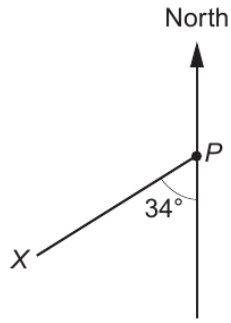
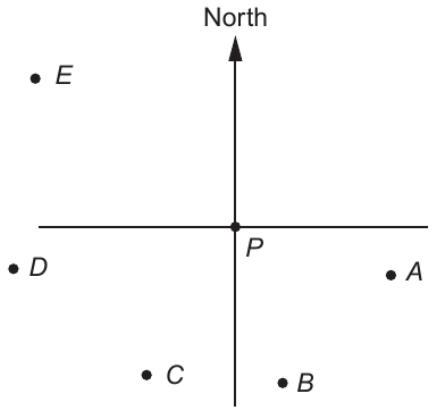


Diagram not drawn to scale

What is the bearing of *X* from point *P*?
Circle the correct answer. [1]

146° 326° 214° 034° 234°

(b) The diagram below shows 6 points on a map. The diagram is drawn to scale.



(i) A ship sails from point *P* on a bearing of 107°.
It sails towards one of the five points *A*, *B*, *C*, *D* or *E*.
Which of the five points is the ship sailing towards?
Circle the correct answer. [1]

A *B* *C* *D* *E*

(ii) A second ship sails from point *P* for a number of miles on a bearing of 070°.
It then changes direction and sails on a bearing of 270°.
It is possible for the ship to reach **only one** of the five points *A*, *B*, *C*, *D* or *E*.
Which point can the ship reach?
Circle the correct answer. [1]

A *B* *C* *D* *E*

Examiner only

7. *A* and *B* are two points **300 metres** apart.

P is a point such that $A\hat{B}P = 115°$ and *BP* = 400 metres.

The line *AB* shown below is part of an **accurate scale drawing** to show the positions of points *A*, *B* and *P*.

Complete the scale drawing to show the **two** possible positions of *P*. [4]

Examiner only

14. The mean of two numbers is 7.
The range of these two numbers is 8.

What are these two numbers? [2]

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.....

.....

.....

.....

.....

The numbers are ☐ and ☐

15.

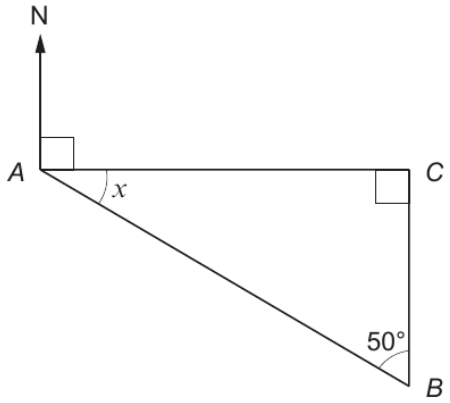


Diagram not drawn to scale

Calculate the size of angle x.
Hence, give the bearing of point *B* from point *A*. [3]

.....

.....

.....

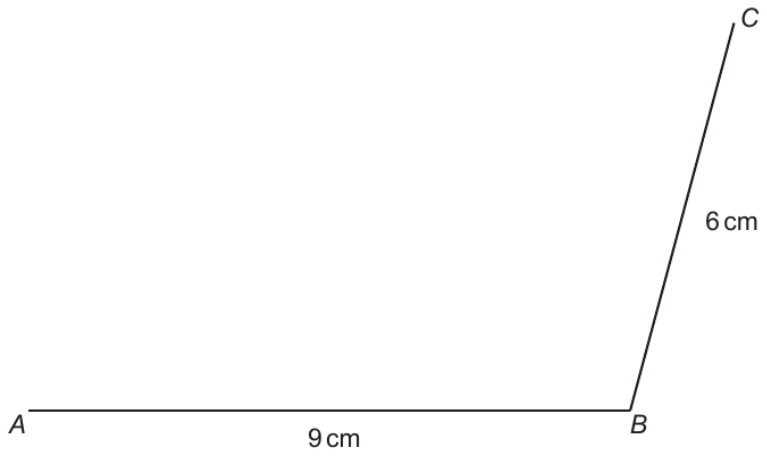
.....

.....

x = ... ° Bearing of point *B* from point *A* = ... °

Examiner only

9. *(a)* Two sides of a parallelogram *ABCD* are drawn accurately below.
Using only a ruler and a pair of compasses, complete an accurate drawing of the parallelogram.
You must show all your construction arcs. [2]



(b) The line *XY* below forms part of a scale drawing of a garden.
The scale drawing has a scale of 1:200.

What is the actual distance between point *X* and point *Y* in the garden?
Give your answer in **metres**. [3]

.....

.....

.....

.....

Actual distance between point *X* and point *Y* = ... metres

Examiner only

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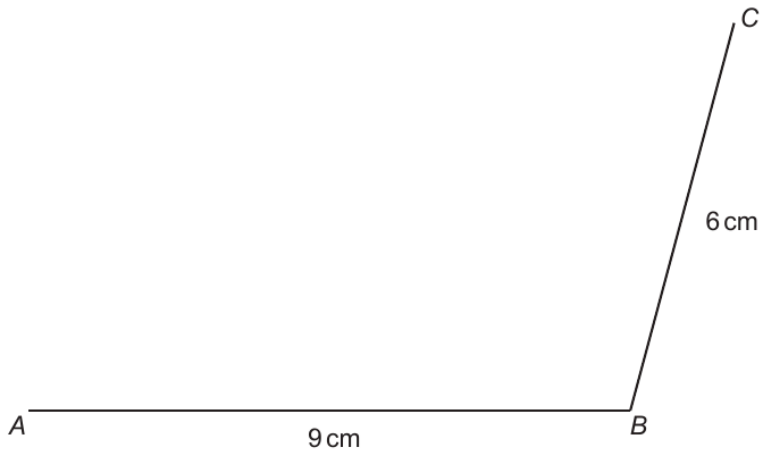

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Give your answer in **metres**. [3]

.....

.....

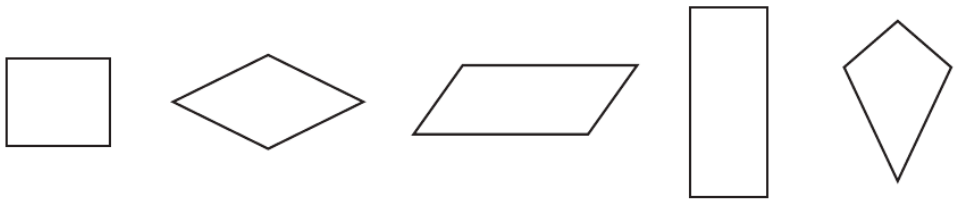
.....

.....

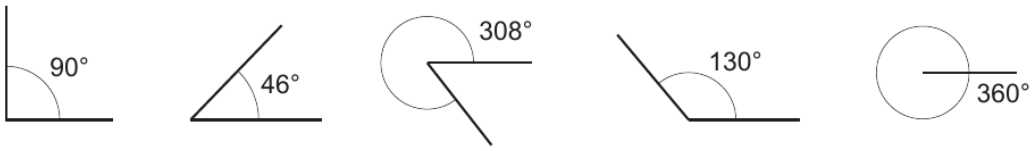
Actual distance between point *X* and point *Y* = ... metres

Examiner only

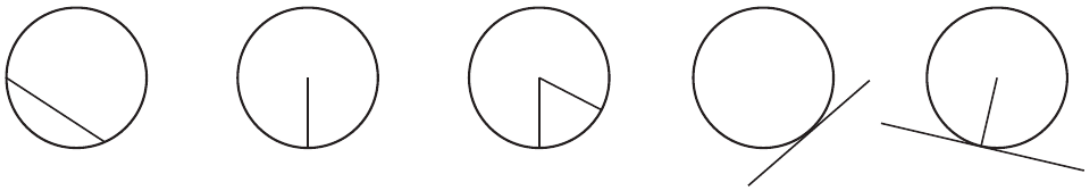
2. (a) The special name for one of the quadrilaterals below is a kite.
Circle the kite. [1]



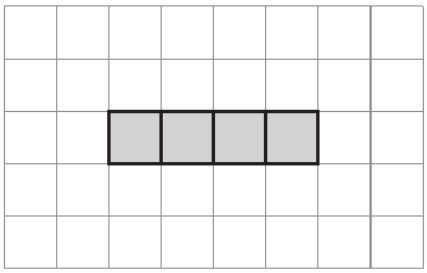
(b) One of the angles shown below is an acute angle.
Circle the acute angle. [1]



(c) One of the diagrams below shows a chord of a circle.
Circle the correct diagram. [1]



(d) Add two squares to the four shaded squares shown below so that the complete diagram forms the net of a cube. [1]

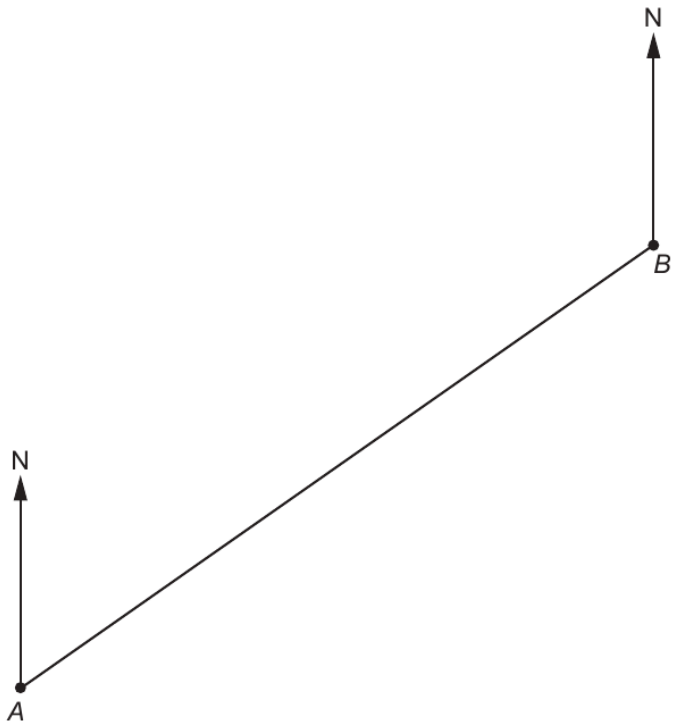


Examiner only

17. Point *A* and point *B* are shown in the scale drawing below.

(a) Point *C* is 35 km from point *B* on a bearing of 300°.
Complete the scale drawing to show the position of point *C*. [2]

Scale: 1 cm represents 5 km



(b) Use your scale drawing to calculate
- the **actual** length of *AC*, in kilometres,
- the bearing of point *C* from point *A*. [2]

Actual length of *AC* = ... km

Bearing of point *C* from point *A* = ... °

Examiner only

9.

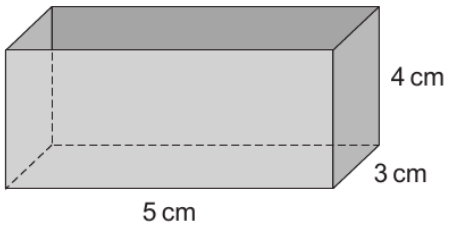
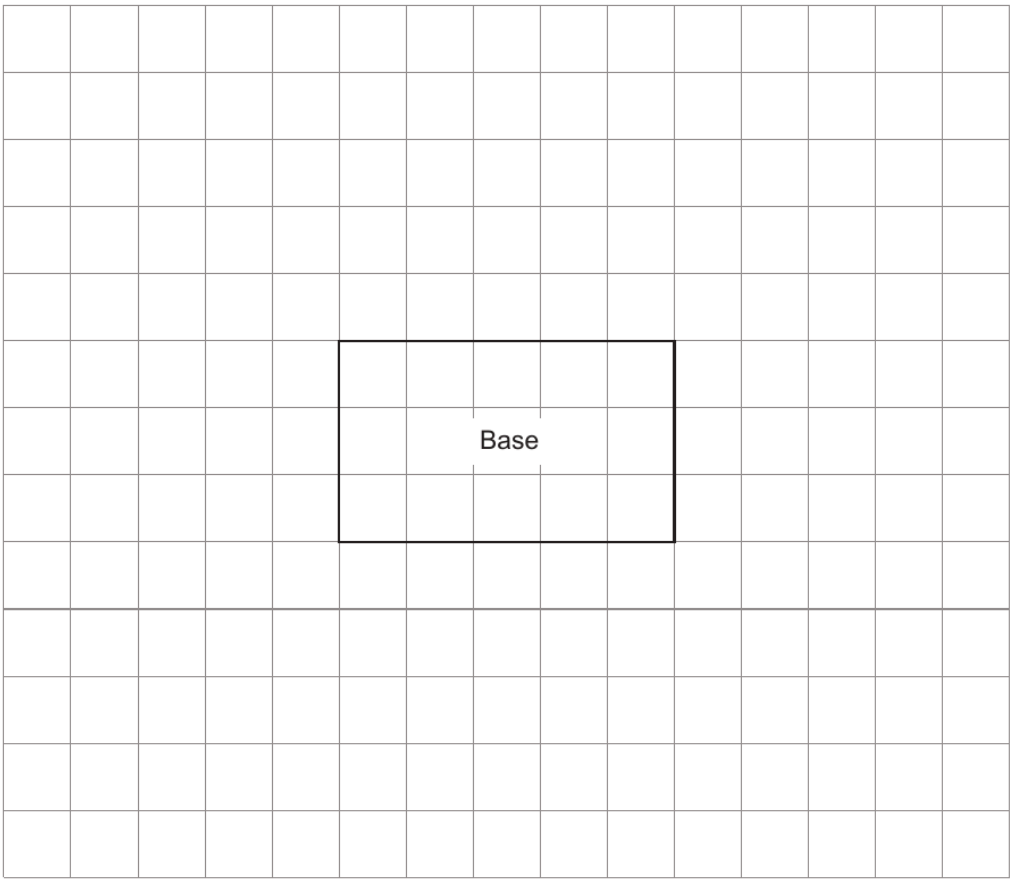


Diagram not drawn to scale

This box is 5 cm long, 3 cm wide and 4 cm high.
The box does **not** have a lid.
Complete an accurate net of the box on the centimetre-squared grid below.
The base has been drawn for you. [2]



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°.

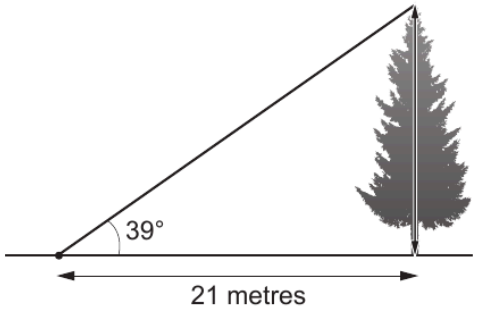


Diagram not drawn to scale

(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]

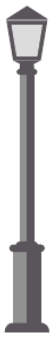
Volume of the log is ..... m^3

Examiner only

7. (a)

Remember:

1 kilowatt (kW) = 1000 watts (W)



There are 8 street lights in Ffordd Alwyn.
Each light is fitted with an 80 watt light bulb.

Each of the 8 street lights is usually on from 6 p.m. to 6 a.m.

It costs 32.4p per hour for each **kilowatt** of electricity used.

How much would be saved **per week** if the 8 street lights were only on from 7 p.m. to 5 a.m.?
Give your answer in pounds, correct to the nearest penny.
You must show all your working. [5]

Examiner only

(b) A lamp post is vertical and stands on horizontal ground.
The angle of elevation of the top of the lamp post is 68° when measured from a point 3·3 m from the centre of the base of the lamp post.

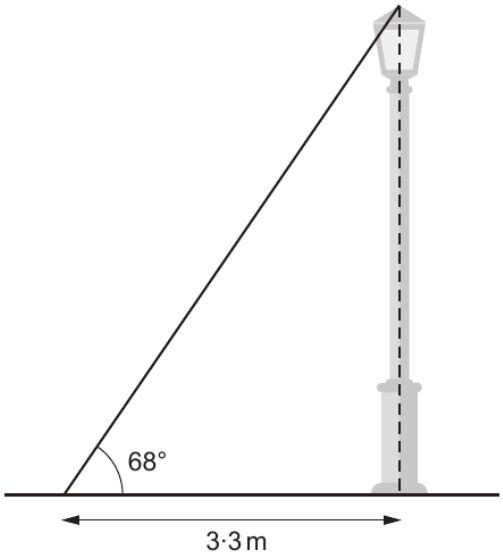


Diagram not drawn to scale

Calculate the height of the lamp post. [3]