Name	Date started	Target end date

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

Conversion graphs, travel graphs and distance-time graphs in real-world contexts. Sourced from legacy WJEC GCSE Mathematics-Numeracy Higher papers, or

REVISE
.wales

1.15 — Conversion, travel & distance-time graphs

Spec 2.5.1, 2.5.2 — Unit 1 (calculator allowed)

Conversion graphs, travel graphs and distance-time graphs in real-world contexts. Sourced from legacy WJEC GCSE Mathematics-Numeracy Higher papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~27 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (18 marks across 3 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).

Conversion, travel & distance-time graphs — what the new spec asks

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

Conversion graphs 2.5.1

- Straight-line graphs through origin used to convert units.
- Read off intercepts and gradients to extract the conversion factor.
- Currency, temperature, distance: same method.

Distance-time graphs 2.5.2

- Gradient of a line on a distance-time graph = speed.
- Horizontal line = stationary; steeper line = faster.
- Negative gradient = returning to start.

Velocity-time graphs 2.5.2

- Gradient = acceleration; area under curve = distance travelled.
- Estimate area with strips/trapezia when curve is non-linear.
- Deceleration = negative gradient.

Piecewise problems 2.5.2

- Split travel into legs; treat each leg separately.
- Total distance / total time = average speed.
- Units must match throughout (km vs m, s vs h).

Crib sheet »

Conversion, travel & distance-time graphs in one page

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

Conversion graphs

Straight line through the origin: $y = kx$.

Read off carefully — check axis labels and scale before quoting a value.

Used for currency, °C/°F, miles/km, etc.

Distance-time graphs

$$\text{gradient} = \text{speed}$$

Flat line = stationary; steeper = faster.

Negative gradient = returning towards start.

Velocity-time graphs

$$\text{gradient} = \text{acceleration}$$
$$\text{area under curve} = \text{distance}$$

Use trapezia / strips for area under curves.

Watch the units — m/s vs km/h.

Piecewise journeys

Split the journey into legs.

Each leg: distance ÷ time = speed for that leg.

Average speed = *total* distance ÷ *total* time, not the mean of leg speeds.

Estimating area under curve

Use n strips of equal width h.

Trapezium rule: $\frac{h}{2}(y_0 + 2y_1 + 2y_2 + \cdots + y_n)$.

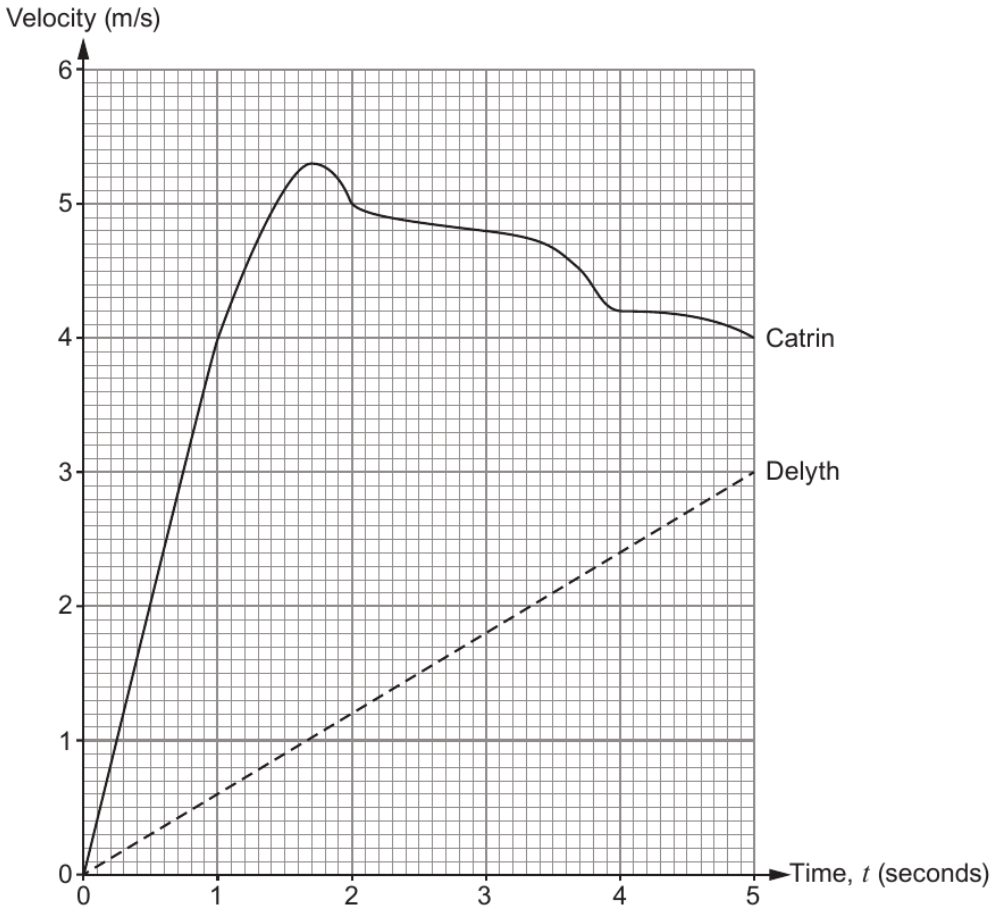
More strips = more accurate.

Common traps

- Reading gradient as speed but using wrong axis units.
- Forgetting to halve the strip width in trapezium rule.
- Confusing distance-time and velocity-time graphs.

Examiner only

9. Two runners, Catrin and Delyth, start a race at the same time.
The velocity-time graph shows their velocities over the first 5 seconds of the race.



(a) After the start of the race, what was the earliest time that Catrin's acceleration was $0\,m/s^2$? [1]

.....

Examiner only

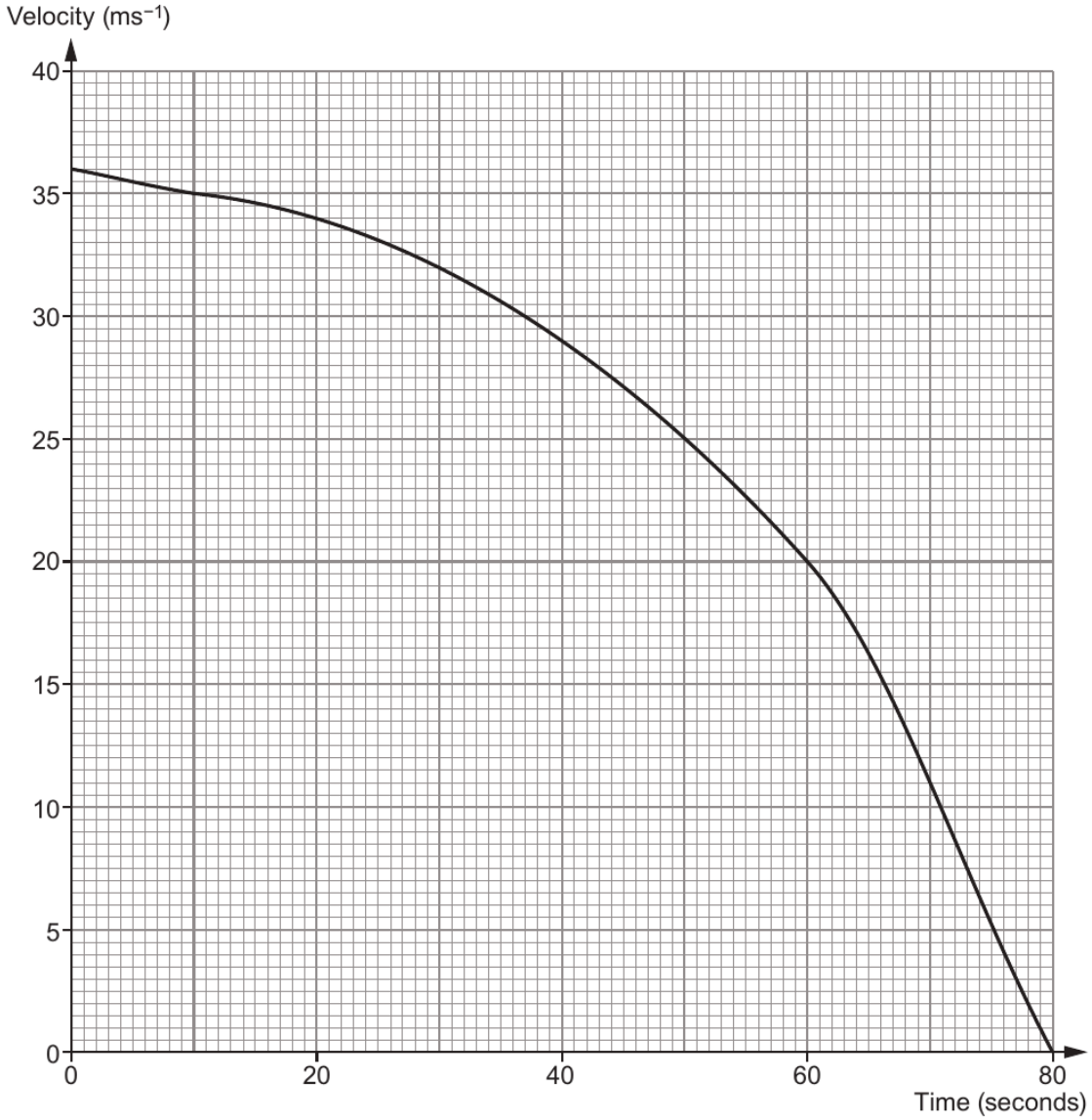
(b) Use the trapezium rule to calculate an estimate of the distance Catrin travelled in the first 5 seconds of the race.
Use Catrin's velocities at times $t = 0$, $t = 1$, $t = 2$, $t = 3$, $t = 4$ and $t = 5$.
You must show all your working. [3]

(c) (i) Calculate an estimate of how far Catrin was ahead of Delyth after 5 seconds. [2]

(ii) Explain why your answer to *(c)* (i) is an underestimate. [1]

Examiner only

9. A train manufacturer has developed a new braking system.
The velocity-time graph shows the velocity of a train from when the new brakes are applied until it comes to rest.



(a) Estimate the train's deceleration at time 60 seconds. [3]

.....

.....

.....

.....

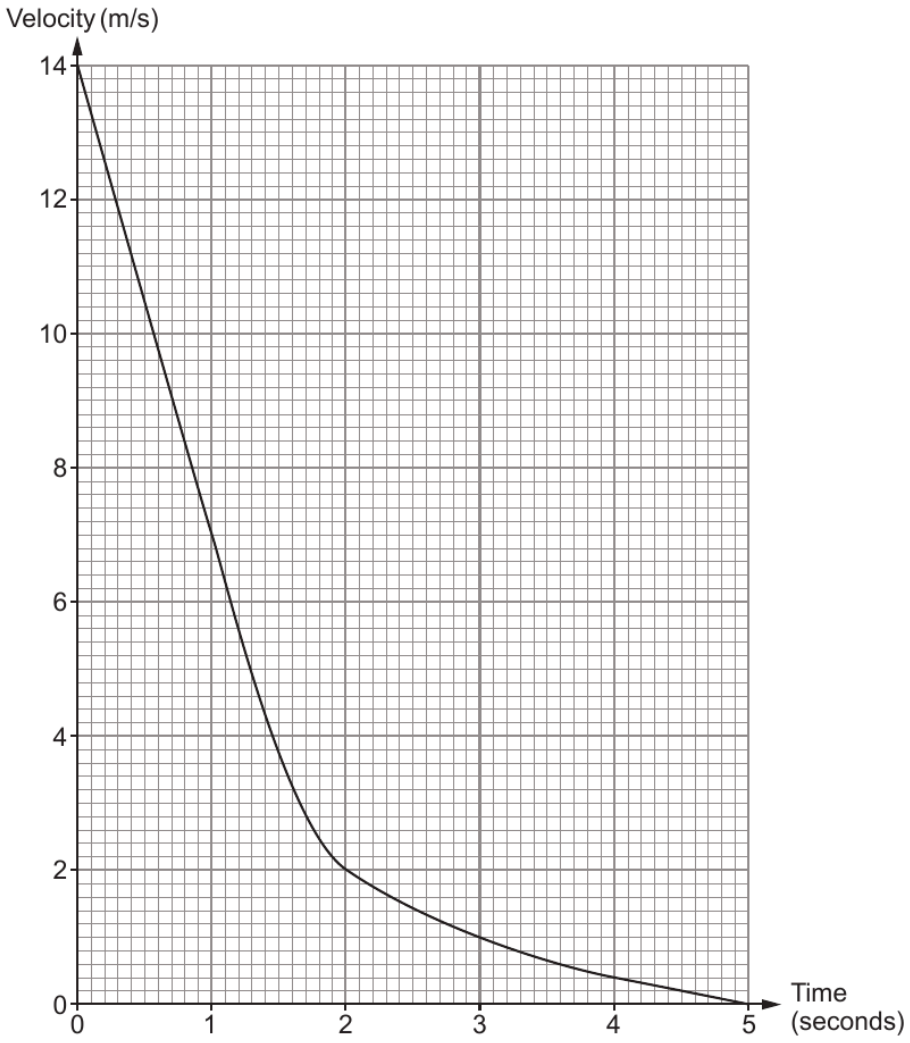
Examiner only

(b) (i) Calculate an estimate of the distance travelled by the train from the instant the brakes are applied until it comes to rest.
You must use exactly 4 strips of equal width. [3]

(ii) Explain how you could use the graph to gain a more accurate estimate of the distance travelled. [1]

11. Ravi is driving his car to work.
He brakes sharply to stop at a set of traffic lights.

The velocity-time graph below shows the last 5 seconds of his journey before the car stops at the lights.



Examiner only

(a) (i) Using 5 strips of equal width, calculate an estimate of the distance the car travelled in these 5 seconds. [3]

(ii) Is your answer to part (a)(i) an overestimate or an underestimate? You must give a reason for your answer. [1]

(b) Estimate the deceleration of Ravi's car at time 2 seconds. Give your answer in its simplest form. [3]

END OF PAPER