Drawing Distance-Time Graphs from Journey Stories

Complete worked example / separate answer key

A cyclist starts at home. She rides for 20 minutes and reaches 4 km. She stops for 10 minutes. Then she rides back home, taking 15 minutes. Draw the distance-time graph and mark the stop.

Answer: Plot (0, 0). Plot (20, 4) and connect with a rising segment. Plot (30, 4) and connect with a horizontal segment labelled stop. Plot (45, 0) and connect with a falling segment back to the start. The stop is the flat segment from 20 to 30 minutes at 4 km.

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Original tasks 1, 2, 3 / complete keys

Task 1

A walker leaves home at time 0 and walks to a shop 3 km away in 30 minutes. He stays at the shop for 15 minutes, then walks home in 30 minutes. Draw the distance-time graph and mark the stop.

Answer: Plot (0, 0), (30, 3), (45, 3), and (75, 0). Connect with a rising segment, a horizontal stop segment from 30 to 45 minutes at 3 km, and a falling segment back to zero.

Reason: The outward walk takes 30 minutes to reach 3 km. The stop keeps distance at 3 km for 15 minutes, so the segment is flat. The return takes another 30 minutes and ends at distance zero.

Check: Trace the graph: rising to 3 km, flat for 15 minutes, falling to 0. Confirm the stop is horizontal and the final distance is zero.

Task 2

A bus leaves a station and travels 10 km in 20 minutes. It waits 10 minutes, then travels 5 km farther in 10 minutes. Draw the graph and label the stop.

Answer: Plot (0, 0), (20, 10), (30, 10), and (40, 15). The stop is the horizontal segment from 20 to 30 minutes at 10 km.

Reason: The first part reaches 10 km at 20 minutes. The wait adds time but no distance, so the graph is flat at 10 km until 30 minutes. The second part adds 5 km, ending at 15 km at 40 minutes.

Check: Check that the stop is flat at 10 km and that the final distance is 15 km. Confirm time increases left to right.

Task 3

A runner jogs 2 km away from home in 10 minutes, turns and jogs back in 5 minutes, then stops for 5 minutes. Draw the graph.

Answer: Plot (0, 0), (10, 2), (15, 0), and (20, 0). The return segment from 10 to 15 minutes is steeper than the outward segment. The final stop is a flat segment from 15 to 20 minutes at 0 km.

Reason: The outward trip covers 2 km in 10 minutes. The return covers the same 2 km in 5 minutes, so it is faster and steeper. The final stop keeps distance at zero for 5 minutes.

Check: Compare slopes: the falling segment should be steeper than the rising segment. Confirm the last segment is flat at zero.

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Original tasks 4 / complete keys

Task 4

A delivery van starts 1 km from the depot, drives to a point 6 km from the depot in 25 minutes, stops for 10 minutes, then returns to the depot in 20 minutes. Draw the graph and mark the stop.

Answer: Plot (0, 1), (25, 6), (35, 6), and (55, 0). The stop is the horizontal segment from 25 to 35 minutes at 6 km. The final point is at distance zero.

Reason: The journey starts at 1 km, not zero. The van reaches 6 km at 25 minutes, waits until 35 minutes, then returns to the depot at 0 km by 55 minutes.

Check: Confirm the start is at 1 km, the stop is flat at 6 km, and the final distance is zero. Check that the return segment falls from 6 km to 0 km.

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Task 1, Task 2, Task 3, Task 4 / Answer key: plotted points, segment descriptions, slope notes

Concise text key for the four tasks; full reasoning is printed by the compiler from the source.

Task 1: Plot (0,0), (30,3), (45,3), (75,0). Rising to 3 km, flat stop 30-45 min at 3 km, falling to 0.

Task 2: Plot (0,0), (20,10), (30,10), (40,15). Stop is flat 20-30 min at 10 km; final distance 15 km.

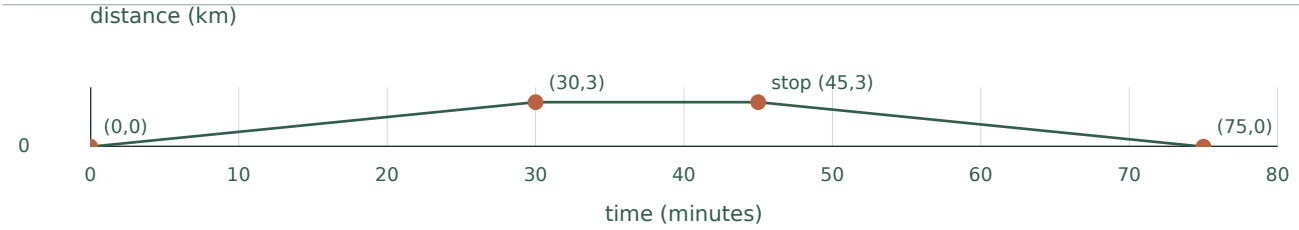
Task 3: Plot (0,0), (10,2), (15,0), (20,0). Return 10-15 min is steeper than outward; final stop flat at 0 km.

Task 4: Plot (0,1), (25,6), (35,6), (55,0). Start at 1 km; stop flat 25-35 min at 6 km; final distance 0 km.

Rubric: axes labelled with units; start plotted correctly; events in time order; stops horizontal and labelled; returns falling with appropriate steepness; final point matches ending distance; graph neat enough to compare slopes.

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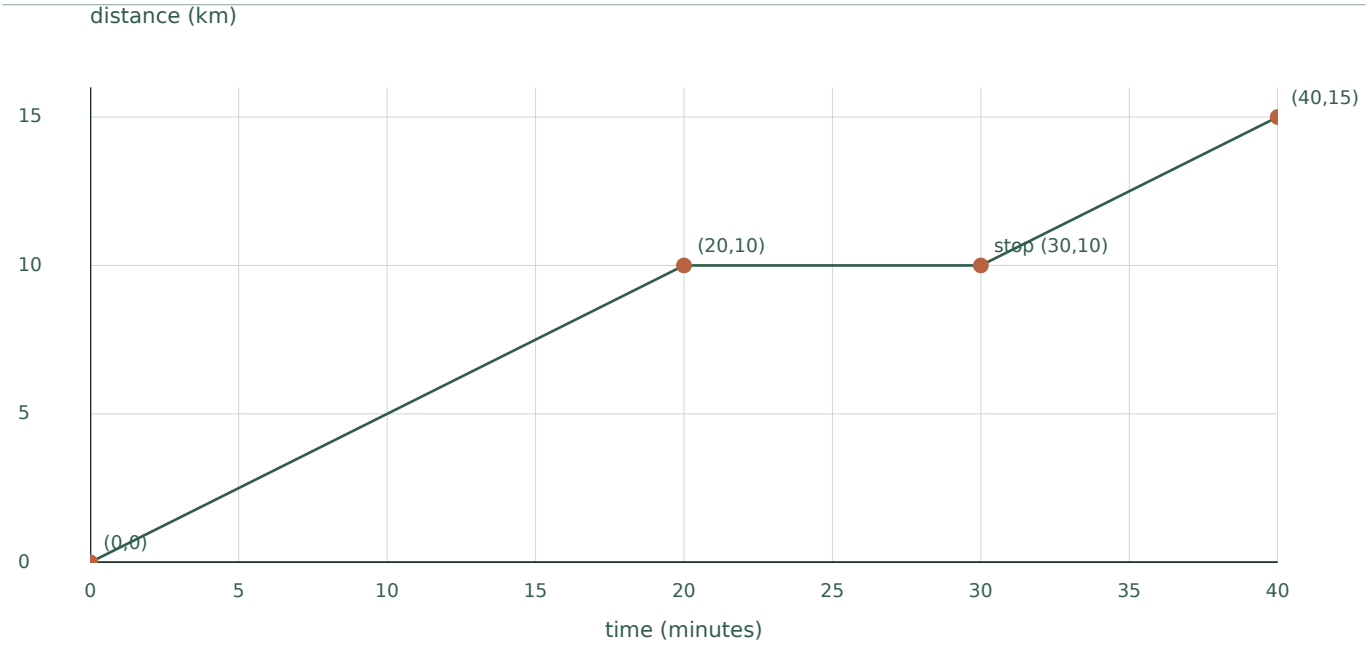
Task 1 / Answer key: Task 1 walker



Stop is horizontal from 30 to 45 minutes at 3 km.

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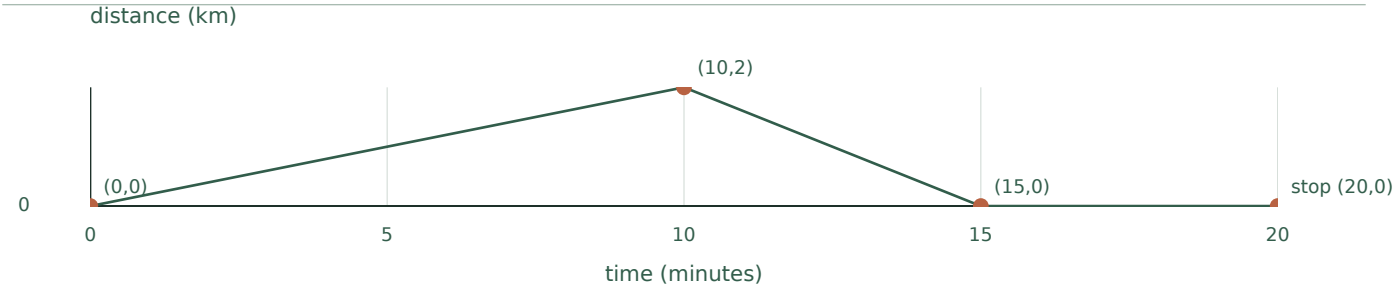
Task 2 / Answer key: Task 2 bus



Stop is horizontal from 20 to 30 minutes at 10 km.

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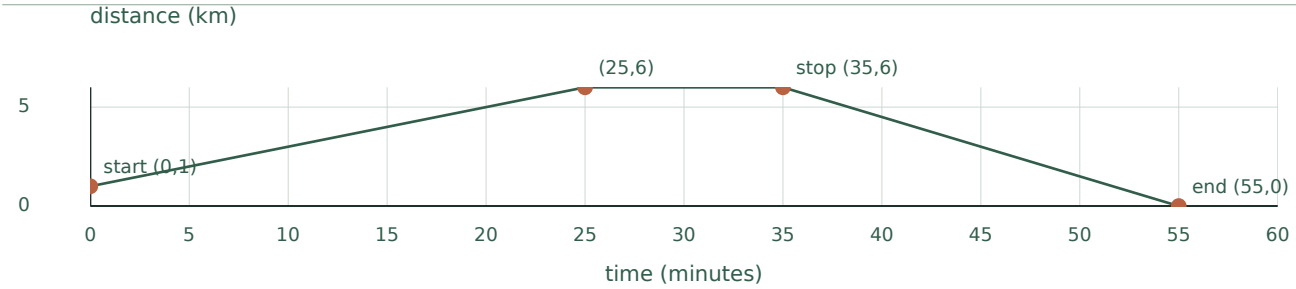
Task 3 / Answer key: Task 3 runner



Return from 10 to 15 minutes is steeper than outward; final stop flat at 0 km.

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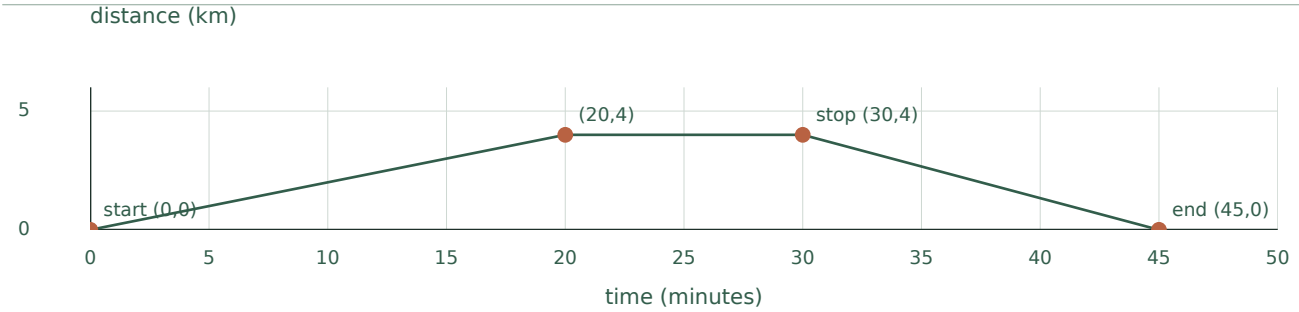
Task 4 / Answer key: Task 4 delivery van



Stop is horizontal from 25 to 35 minutes at 6 km; final distance zero.

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Worked example / Worked example: cyclist rides 20 min to 4 km, stops 10 min, returns home in 15 min



Stop is the horizontal segment from 20 to 30 minutes at 4 km.

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Source rubric / reflection

- [ ] Axes are labelled with time and distance units.
- [ ] The starting point is plotted correctly, usually at (0, 0).
- [ ] Each journey event is represented by a correct segment in time order.
- [ ] Stops are drawn as horizontal segments and labelled.
- [ ] Returns are drawn as falling segments with appropriate steepness.
- [ ] The final point matches the ending distance in the story.
- [ ] The graph is neat enough to compare slopes and read points.

Reflection: What did you check, what did you change, and what will you try next?