JUNIOR CYCLE MATHS · FREE REVISION SHEET

Speed, distance, time & currency

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Learning outcomes (2018 specification): N.3b, GT.1, U.6. Play the game: **leim.ie/road-trip.html**

1. The three formulas

S = D ÷ T	**D = S × T**	**T = D ÷ S**
speed	distance	time

km and hours → km/h. Metres and seconds → m/s. 240 km in 3 h: 240 ÷ 3 = **80 km/h**.

2. Time in hours

15 min = 0.25 h	30 min = 0.5 h	45 min = 0.75 h
6 min = 0.1 h	12 min = 0.2 h	20 min = ⅓ h

Minutes ÷ 60 = hours: 2 h 24 min = **2.4 h** (NOT 2.24). Back again: only the decimal part × 60: 1.35 h = 1 h + 0.35 × 60 = **1 h 21 min**.

Arrival time = leaving time + journey time: 09:40 + 2 h 35 min = **12:15**.

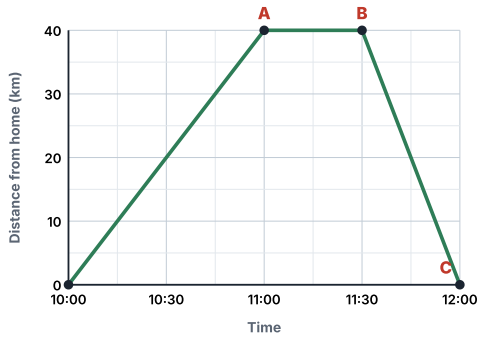
3. Average speed

Total distance ÷ total time, stops included. 120 km at 60 km/h (2 h), back at 40 km/h (3 h): 240 ÷ 5 = **48 km/h**, not the mean (50).

4. km/h and m/s

m/s × 3.6 = km/h; km/h ÷ 3.6 = m/s. 20 m/s = **72 km/h**.

5. Distance–time graphs



Up = moving away · **flat** = stopped · **down** = coming back. **Steeper = faster.** O to A: 40 km in 1 h = 40 km/h; stopped 30 min; B to C: 40 km in 30 min = 80 km/h. Whole trip: 80 km ÷ 2 h = 40 km/h.

6. Currency

€ → other	**× the rate**: €1 = £0.86, €250 × 0.86 = £215
other → €	**÷ the rate**: £215 ÷ 0.86 = €250
Commission	take the % off the euro first, then change the rest
The rate	£344 for €400: 344 ÷ 400 = 0.86

Where is it cheaper? Change both prices into euro, then compare. Round money to the nearest cent at the end.

Classic mistakes: 2 h 30 min as 2.3 h · the mean of two speeds · leaving out a stop · multiplying to go back into euro · reading the distance off a graph when the speed is asked.

Exam tip: write the time in hours first, then the formula, then the numbers, then the answer WITH units. Each step earns marks.

PRACTICE · 34 QUESTIONS

Have a go

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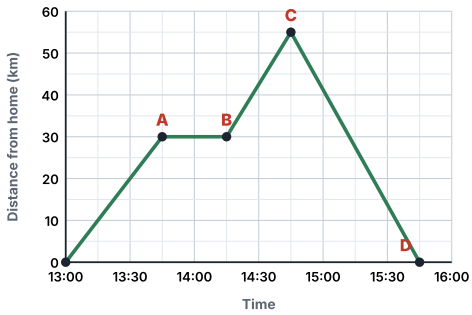
A. Speed, distance and time

1. A car travels 240 km in 3 hours. Find its average speed. _____
2. A bus travels at 60 km/h for 2 h 30 min. How far does it go? _____
3. How long does it take to travel 180 km at 72 km/h? _____
4. Write 1 h 45 min in hours, as a decimal. _____
5. Write 2.4 hours in hours and minutes. _____
6. A train travels 117 km in 1 h 18 min. Find its average speed. _____
7. Kate leaves at 08:50 and drives 195 km at 78 km/h. When does she arrive? _____
8. A cyclist rides at 18 km/h for 40 minutes. How far does she go? _____

B. Average speed and units

9. Seán drives 100 km in 1 h 15 min, then 80 km in 45 min. Find his average speed for the whole journey.
   _____
10. A lorry travels for 2 hours at 90 km/h, then 1 hour at 60 km/h. Find its average speed. _____
11. Méabh cycles 60 km to the lake at 30 km/h and back at 20 km/h. Find her average speed for the round trip.
    _____
12. Change 72 km/h into metres per second. _____
13. Change 15 m/s into km/h. _____
14. Oisín runs 400 m in 50 seconds. Find his average speed in m/s. _____
15. Ciara drives 150 km in 2 h, stops for 30 min, then drives 120 km in 1 h 30 min. Find her average speed, including the stop. _____

C. The graph shows Ruth's drive from home



16. How far from home was Ruth at 13:45? _____
17. How long did Ruth stop for? _____
18. Find Ruth's speed from O to A. _____
19. Find Ruth's speed from B to C. _____
20. Find Ruth's speed from C to D. _____
21. On which part was Ruth fastest? How can you tell from the graph?
    _____
22. Find Ruth's average speed for the whole journey, including the stop.
    _____

D. Currency

23. €1 = £0.86. Change €400 into sterling. _____
24. €1 = $1.08. Change €750 into US dollars. _____
25. €1 = £0.86. Change £172 into euro. _____
26. €1 = $1.08. Change $250 into euro, to the nearest cent. _____
27. A bank takes 2% commission, then changes the rest at €1 = $1.10. How many dollars do you get for €500?
    _____
28. Ultan changes €300 and gets £258. Find the rate: €1 = £? _____
29. Headphones cost £85 in Newry and €96 in Dundalk. €1 = £0.86. Where are they cheaper, and by how much?
    _____
30. €1 = CHF 0.94. Change €620 into Swiss francs. _____

Questions 31–34 are on the next page.

EXAM-STYLE · THEN CHECK

Exam corner + answers

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E. Exam-style questions (show your work)

31. **The school tour.** A coach travels 255 km. It leaves at 07:45 and its average speed is 85 km/h. (a) How long does the journey take? (b) When does it arrive? (c) The journey home takes 3 h 45 min, including a 30-minute stop. Find the average speed for the journey home. (d) Find the average speed when the coach was moving, to 1 decimal place.

32. **The beach walk.** Emma walks 6 km to the beach in 1 h 30 min, stays for 1 hour, then walks home in 1 h 15 min. (a) Find her speed on the way there. (b) Find her speed on the way back. (c) Find her average speed for the whole trip, including the hour at the beach. (d) Sketch a distance–time graph of her trip.

33. **New York.** Jack changes €1,500 into dollars at €1 = $1.12. He spends $1,420 and changes the rest back at €1 = $1.16. (a) How many dollars does he get? (b) How many euro does he get back, to the nearest cent? (c) How much more would he have got back if the rate had stayed at $1.12?

34. **The fun run.** Liam runs the first 3 km at 12 km/h and the next 3 km at 10 km/h. (a) How long does each half take? (b) Find his average speed for the 6 km, to 1 decimal place. (c) Explain why it isn't 11 km/h. (d) A sprinter runs 100 m in 12.5 s. Find her speed in m/s and in km/h.

Answers

A	1. 80 km/h · 2. 150 km · 3. 2 h 30 min · 4. 1.75 hours · 5. 2 h 24 min · 6. 90 km/h · 7. 11:20 · 8. 12 km
B	9. 90 km/h · 10. 80 km/h · 11. 24 km/h · 12. 20 m/s · 13. 54 km/h · 14. 8 m/s · 15. 67.5 km/h
C	16. 30 km · 17. 30 min · 18. 40 km/h · 19. 50 km/h · 20. 55 km/h · 21. C to D (steepest) · 22. 40 km/h
D	23. £344.00 · 24. $810.00 · 25. €200.00 · 26. €231.48 · 27. $539.00 · 28. £0.86 · 29. Dundalk, by €2.84 · 30. CHF 582.80
E	31. (a) **3 h** (b) **10:45** (c) 255 ÷ 3.75 = **68 km/h** (d) 255 ÷ 3.25 = **78.5 km/h** · 32. (a) **4 km/h** (b) **4.8 km/h** (c) 12 ÷ 3.75 = **3.2 km/h** (d) up, flat for 1 h, then down to 0, steeper than the way there · 33. (a) **$1,680.00** (b) $260 ÷ 1.16 = **€224.14** (c) €232.14 − €224.14 = **€8.00** · 34. (a) **15 min**, **18 min** (b) 6 ÷ 0.55 = **10.9 km/h** (c) more time is spent at 10 km/h (d) **8 m/s** = **28.8 km/h**

Got one wrong? Check: did you change the minutes into hours (÷ 60) before dividing? For average speed, did you use the TOTAL distance and the TOTAL time, stops included? For currency, did you multiply going out of euro and divide coming back? Then play **Road Trip** at leim.ie/road-trip.html: the "Go back over these" list at the end shows the rule for each mistake.

All questions written by Léim. Léim is independent and not connected with the State Examinations Commission or the NCCA. Exchange rates here are examples; the exam always gives you the rate to use.