

Fix it 1 Which one is missing?

Speed, distance and time · ANSWERS

Find the two the question gives you and the one it asks for. The units tell you which is which: km/h or mph is a speed, km or miles a distance, hours or minutes a time.

EXAMPLE

A kite surfer goes at 30 km/h for 40 minutes. How far does she go?

1. 30 km/h is a speed.
2. 40 minutes is a time.
3. How far: find the distance.

YOUR TURN

- 1 A bus travels 42 miles in 1 hour 10 minutes. Find its average speed.

speed; know distance and time

- 2 A lift rises 96 m at 4 m/s. How long does it take?

time; know distance and speed

- 3 A train leaves at 08:50 and arrives at 10:20. It runs at 84 km/h. How many kilometres does it travel?

distance; know time and speed

Check: Every number you use has a unit. Each one of the three appears once: two known, one asked for.

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Fix it 2 Match the units

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km/h and mph need the time in hours, and the distance in the speed's unit. Minutes into hours: the minutes over 60. 20 minutes is $\frac{20}{60} = \frac{1}{3}$ hour, not 0.2.

EXAMPLE

The speed is in km/h. Write 2 hours 15 minutes in hours.

1. 15 minutes = $\frac{15}{60}$ hour
2. $15 \div 60 = 0.25$
3. 2 hours 15 minutes = 2.25 hours, not 2.15

YOUR TURN

- 1 The speed is in mph. Write 1 hour 45 minutes in hours.

1.75 hours

- 2 The speed is in km/h. Write 2 hours 20 minutes in hours.

$2\frac{1}{3}$ hours (not 2.2)

- 3 The speed is in km/h. A distance is 3750 m. Write it in km.

3.75 km

Check: Multiply the part of an hour by 60. You get the minutes back.

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Fix it 3 Set up the table

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Time (hours) on the top row, distance under it. The 1 hour column holds the speed: the distance in 1 hour. Put in the two you know and ? for the one you want.

EXAMPLE

A canoe goes 91 km in 3.25 hours. Find its speed.

1. Top row: 1 and 3.25 hours.
2. Bottom row: ? and 91 km.
3. The table:

Time (hours)	1	3.25
Distance (km)	?	91

YOUR TURN

- 1 A cyclist rides 54 km in 2.25 hours. Find her speed. Draw the table. Put ? for the one you want.

Time (hours)	1	2.25
Distance (km)	?	54

- 2 A coach travels at 64 mph for 2.5 hours. How far does it go? Draw the table. Put ? for the one you want.

Time (hours)	1	2.5
Distance (miles)	64	?

- 3 A courier van travels 140 km at 56 km/h. How long does it take? Draw the table. Put ? for the one you want.

Time (hours)	1	?
Distance (km)	56	140

Check: Read your table aloud: in 1 hour it goes the speed, in the time it goes the distance. It matches the question.

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Fix it 4 Scale along the row

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Do the same to both rows. 1 to 2.5 hours is $\times 2.5$, so the distance is the speed $\times 2.5$. Back to the 1 hour column: $\div 2.5$. Time missing: the speed $\times$ the time = the distance.

EXAMPLE

Time (hours)	1	3.25
Distance (km)	?	117

Find the speed.

1. 1 to 3.25 hours is $\times 3.25$.
2. So the speed $\times 3.25 = 117$.
3. speed = $117 \div 3.25 = 36$ km/h

YOUR TURN

Time (hours)	1	1.5
Distance (miles)	48	?

Find the distance.

$$48 \times 1.5 = 72 \text{ miles}$$

Time (hours)	1	2.75
Distance (km)	?	154

Find the speed.

$$154 \div 2.75 = 56 \text{ km/h}$$

Time (hours)	1	?
Distance (km)	45	117

Find the time.

$$117 \div 45 = 2.6 \text{ hours}$$

Check: Multiply the 1 hour column by the time. You get the distance in your table.

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Fix it 5 Answer in the units asked

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Give the answer in the unit the question asks for. Hours into hours and minutes: the part after the point $\times 60$.
2.4 hours is 2 hours 24 minutes, not 2 hours 40 minutes.

EXAMPLE

time = 3.75 hours. Give it in hours and minutes.

- 3 whole hours.
- $0.75 \times 60 = 45$ minutes
- 3 hours 45 minutes, not 3 hours 75 minutes

YOUR TURN

- 1 time = 1.6 hours. Give it in hours and minutes.

1 hour 36 minutes

- 2 distance = 0.45 km. The question asks for metres.

450 m

- 3 time = $17 \div 6 = 2.8333\dots$ hours. Give it in hours and minutes.

2 hours 50 minutes

Check: Change it back: $24 \div 60 = 0.4$, so 2 hours 24 minutes is 2.4 hours.

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Fix it 6 Sense check

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Put your answer back: the speed $\times$ the time in hours gives the distance. Then ask if the speed suits what is moving: people walk at about 5 km/h.

EXAMPLE

Ana finds a lorry goes 150 km in 2 hours 30 minutes at 60 km/h. Check it.

- 2 hours 30 minutes = 2.5 hours
- $60 \times 2.5 = 150$ ✓
- 60 km/h for a lorry: sensible.

YOUR TURN

- 1 Ben says a horse trotting at 15 km/h for 1 hour 20 minutes goes 18 km. Is he right?

No: $15 \times 1\frac{1}{3} = 20$ km

- 2 Cara says a 9 km walk at 6 km/h takes 1 hour 50 minutes. Is she right?

No: $6 \times 1\frac{5}{6} = 11$ km, not 9

- 3 A cyclist rides 18 km in 45 minutes. Dev works out $18 \div 45 = 0.4$ km/h. Is that sensible?

No: $18 \div 0.75 = 24$ km/h

Check: Use any two of your three to work out the third. It matches the question.

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