MATHEMATICS · GRADES 7-9

Speed, distance, and time

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you plan a trip, like working out when to leave to arrive on time, how far you can drive on a tank of gas, or how fast you are really going. Speed, distance, and time are tied together, so knowing any two tells you the third. That is how you check whether you can make it to a game before kickoff, or how far a tank of gas will actually take you. It is the same thinking behind a bus timetable, a delivery estimate, or a race pace.



Rule

Speed, distance, and time: distance = speed × time.

If you know any two of the three, the third follows from the same relation.

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Worked examples

EXAMPLE 1

Q A car travels 180 km in 3 hours. What is its speed?

SOLUTION

This is a speed question, so start with the one rule to remember: speed = distance divided by time.

The distance is 180 km and the time is 3 hours, so the speed is 180 divided by 3. One hundred eighty divided by 3 is 60.

So the speed is 60 km/h.

EXAMPLE 2

Q A cyclist rides 6 km in 20 minutes. What is the speed in km/h?

SOLUTION

This is a speed question with a trap, so fix the units first. The speed is asked in km/h, so the time must be in hours, not minutes.

Twenty minutes is 20 over 60 of an hour, which is $\frac{1}{3}$ of an hour. So the speed is 6 divided by $\frac{1}{3}$, and dividing by a third is the same as multiplying by 3.

So the speed is 18 km/h.

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Practice questions

1 A train travels 120 km in 2 hours. What is its speed?

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2 A runner goes 16 km at 8 km/h. How long does the run take?

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3 A car travels at 70 km/h for 2 hours. How far does it go?

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4 A train travels at 80 km/h. How far does it go in 15 minutes?

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5 Convert 54 km/h to m/s.

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6 A bus travels 90 km in 2 hours, including a 30 minute stop. What is the average speed for the whole trip?

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7 Two runners race 100 m. A finishes in 20 s and B finishes in 25 s. Who is faster, and by how much in m/s?

- **A** B, by 1 m/s
- **B** A, by 2 m/s
- **C** A, by 1 m/s
- **D** B, by 2 m/s

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8 If you double your speed, what happens to the time for the same distance?

- **A** It doubles
- **B** It halves
- **C** It stays the same
- **D** It drops to zero

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9 **How long does it take to travel 150 km at 50 km/h, in minutes?**

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10 **A car travels 60 km at 30 km/h, then 60 km at 60 km/h. What is the average speed for the whole 120 km?**

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ANSWER KEY

1. 60

2. 2

3. 140

4. 20

5. 15

6. 45

7. A, by 1 m/s

8. It halves

9. 180

10. 40

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