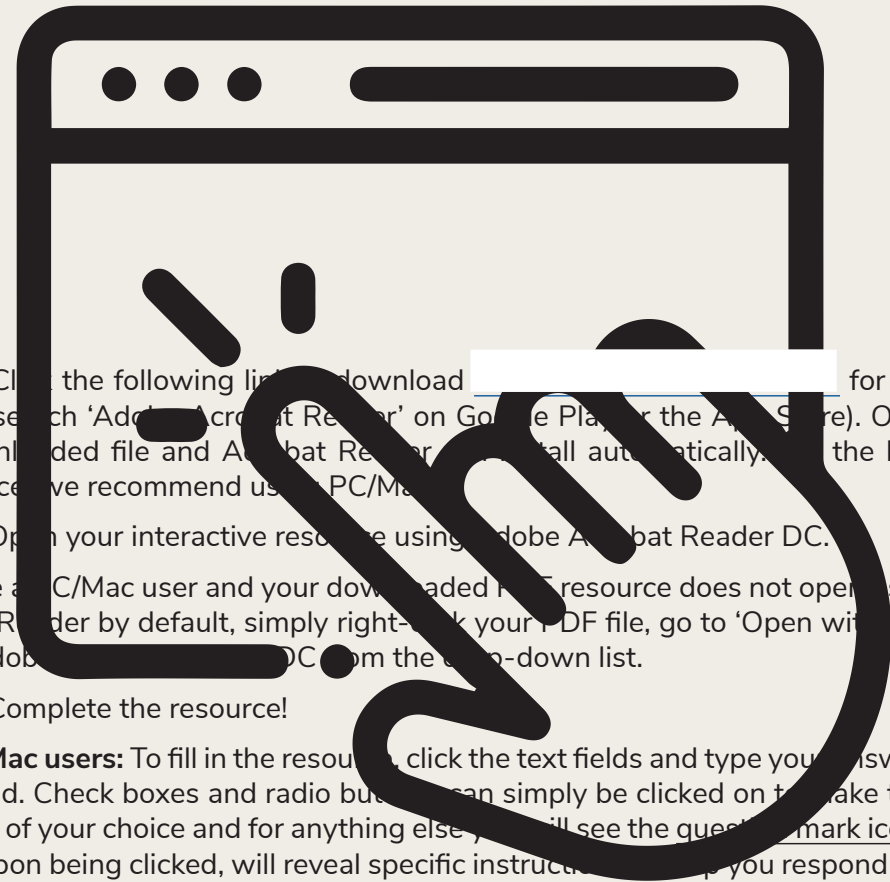


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In a move towards offering an even more versatile spread of resources, some of our worksheets feature interactive fields that can be filled in on computers and smart devices, without having to print the page. Follow the guidance in the next column for a smooth, stress-free means of accessing this content using free-to-download PDF reading software.



Step 1: Click the following link to download [Adobe Acrobat Reader DC](#) for PC/Mac (or search 'Adobe Acrobat Reader' on Google Play or the App Store). Open the downloaded file and Adobe Acrobat Reader will install automatically. For the best experience we recommend using PC/Mac.

Step 2: Open your interactive resource using Adobe Acrobat Reader DC.

If you are a PC/Mac user and your downloaded PDF resource does not open using Acrobat Reader by default, simply right-click your PDF file, go to 'Open with' and select Adobe Acrobat Reader DC from the drop-down list.

Step 3: Complete the resource!

For PC/Mac users: To fill in the resource, click the text fields and type your answers as needed. Check boxes and radio buttons can simply be clicked on to make the selection of your choice and for anything else you will see the question mark icon (which, upon being clicked, will reveal specific instructions for you respond to the corresponding question or activity). When you are finished with the resource, go to File > Save As... and save your file in a memorable location.

For smart device users: To fill in the resource, follow the same process as described above. When you are finished, simply press the back button in the top left of the appscreen and your PDF will save automatically.

Remember: Saving your PDF will overwrite the original file, so be sure to create a copy before starting if you wish to keep a blank copy of the resource on your device.

We hope you have found this information useful. If you experience any problems in following the instructions above, please contact the Beyond team at [beyond@regentstudies.com](#) and we will do our best to help with your query.

Speed, Distance, Time Answers

Unless otherwise stated, give your answer to any speed questions in kilometres per hour (km/h).

1. Calculate the average speed of a car travelling 100km in 2 hours.

$$\frac{100}{2} = 50\text{km/h}$$

2. Calculate the average speed of a rambler who travels 12km in 3 hours.

$$\frac{12}{3} = 4\text{km/h}$$

3. Calculate the average speed of a train travelling 25km in 20 minutes.

$$20 \text{ mins} = \frac{1}{3} \text{ of an hour} \quad 25 \div \frac{1}{3} = 75\text{km/h}$$

4. Calculate the distance travelled by a cyclist travelling at 7km/h for 5 hours.

$$7 \times 5 = 35\text{km}$$

5. Calculate the distance travelled by a swimmer swimming at 3km/h for 30 minutes.

$$30 \text{ minutes} = \frac{1}{2} \text{ an hour} \quad 3 \times \frac{1}{2} = 1.5\text{km}$$

6. Calculate how long it would take for a car to travel 50km if it was travelling at an average speed of 20km/h. Give your answer in minutes.

$$\frac{50}{20} = 2.5 \text{ hours} \quad 2.5 \text{ hours} = 150 \text{ minutes}$$

7. Calculate how long it would take a runner to run 5km if they were running at an average speed of 4km/h. Give your answer in hours and minutes.

$$\frac{5}{4} = 1.25 \text{ hours} \quad 1.25 \text{ hours} = 1 \text{ hour } 15 \text{ minutes}$$

8. Emma travels from Newcastle to London, a distance of 283 miles, by car. It takes her 4 hours and 20 minutes. Pete does the same journey by train. The train travels 285 miles at an average speed of 90mph.

- a. Assuming Emma and Pete leave at the same time, who will arrive in London first?

$$\text{time} = \text{distance} \div \text{speed}$$

$$= 285 \div 90$$

$$= 3.166... \text{ hours}$$

$$= 3 \text{ hours } 10 \text{ minutes}$$

Pete will arrive first.

- b. Explain why Pete's speed is an average speed.

The train will stop at stations so the speed will not be constant.

- c. Find Emma's average speed in miles per hour. Give your answer correct to 1 decimal place.

4 hours and 20 minutes = 4.33... hours

speed = distance ÷ time

$$= 283 \div 4.33...$$

$$= 65.3\text{mph (1d.p.)}$$

9. Sofia can run 200 metres in 26 seconds.

- a. Estimate the time it will take her to run 300m, giving your answer in seconds.

speed = distance ÷ time

$$= 200 \div 26$$

$$= 7.69... \text{ seconds}$$

time = distance ÷ speed

$$= 300 \div 7.69...$$

$$= 39 \text{ seconds}$$

- b. Sofia says, "It will take me 3 minutes 15 seconds to run 1500m". Do you agree with Sofia?

$$1500 \div 300 = 5$$

$$39 \times 5 = 195 \text{ seconds}$$

$$= 3 \text{ minutes and } 15 \text{ seconds}$$

Mathematically, Sofia is correct. However, physically, it is unlikely that she would be able to maintain the same speed over a much longer distance.

Challenge

Mira is sailing from Liverpool, England to Liverpool, Canada. They want to beat their personal record of 43 days, 4 hours and 23 minutes. The total distance is 2792 miles.

Unfortunately, Mira has trouble with their boat and has to stop the voyage at St John's, Canada. Mira has been sailing for 31 days, 8 hours and 34 minutes and has travelled a distance of 2175 miles.

Was Mira on track to beat their personal record?

Liverpool, England → Liverpool, Canada

$$43 \text{ days} = 43 \times 24 = 1032 \text{ hours}$$

$$23 \text{ minutes} = 23 \div 60$$

$$= 0.383... \text{ hours}$$

$$\text{Total time} = 1032 + 4 + 0.383...$$

$$= 1036.383... \text{ hours}$$

$$\text{Speed} = 2792 \div 1036.383... = 2.69\text{mph (2d.p.)}$$

Liverpool, England → St John's, Canada

$$31 \text{ days} = 31 \times 24 = 744 \text{ hours}$$

$$34 \text{ minutes} = 34 \div 60$$

$$= 0.566... \text{ hours}$$

$$\text{Total time} = 744 + 8 + 0.566...$$

$$= 752.566... \text{ hours}$$

$$\text{Speed} = 2175 \div 752.566... = 2.89\text{mph (2d.p.)}$$

Yes, Mira was on track to beat their previous record.

Speed, Distance, Time

Prior Knowledge:

- Be able to confidently multiply and divide integers and decimals.
- Be able to multiply and divide integers and decimals by powers of 10.
- Be able to substitute into formulae.

The speed of an object is how far an object travels in 1 unit of time. The unit of time can be anything – days, minutes, hours or even years. Usually, you see questions where 1 unit of time is 1 hour or 1 second.

You have probably seen speed limit signs on the road. In the UK, these are in miles per hour (mph). For example, a 30mph limit means you should travel no more than 30 miles in one hour.

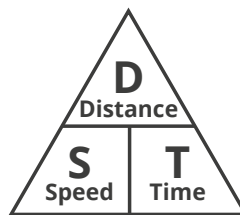
The speed of sound is 343m/s (metres per second). This means that, every second, a sound wave will travel 343m. In 2 seconds, it will travel 686m; in 10 seconds, it will travel 3430m; and so on.

To find the speed of an object, you divide the distance travelled by the time taken.

Many people prefer to remember the formula:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

However, you might prefer to use this formula triangle to help you:



Example 1: Jerry cycles 8km in 30 minutes. Calculate his speed, giving your answer in kilometres per hour.

Jerry's distance is 8km and his time is 30 minutes. However, the question specifies that our answer must be in kilometres per hour so we have to start by changing 30 minutes into hours.

30 minutes = $\frac{1}{2}$ or 0.5 of an hour

$$\begin{aligned} \text{speed} &= \frac{\text{distance}}{\text{time}} \\ &= \frac{8}{0.5} = 16 \text{ km/h} \end{aligned}$$

By covering up each variable in the formula triangle, we can see the formula to calculate it. For example, if we cover up time, we are left with D over S, so $\text{time} = \frac{\text{distance}}{\text{speed}}$

Example 2: Beth travels at 2m/s for 2 minutes. Find the distance travelled in metres.

This time, we are asked to find the distance. Covering distance in the formula triangle gives us speed and time on the bottom row of the triangle. Therefore, $\text{distance} = \text{speed} \times \text{time}$

However, note that the speed is in metres per second and the time taken is in minutes. To carry out an accurate calculation, these measurements should be in the same unit. In this example, it is easier to convert our 2 minutes to seconds. There are 60 seconds in a minute so 2 minutes is equivalent to 120 seconds.

$$\begin{aligned}\text{distance} &= \text{speed} \times \text{time} \\ &= 2 \times 120 \\ &= 240\text{m}\end{aligned}$$

Your Turn

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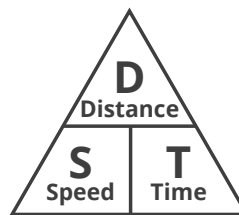
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