S1 Home Learning

Speed, Distance, Time
2 weeks

Watch the video tutorials and read the online notes then attempt the worksheets attached.

https://youtu.be/o8DSb6D-0fw - Video Notes

https://www.bbc.co.uk/bitesize/guides/z4swxnb/revision/1 - bitesize notes, video and questions

Converting Hours Mins – Decimal Times

Minutes => Decimals =>

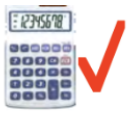
48 minutes is $\frac{48}{60}$ of an hour = 48 ÷ 60 = **0·8 hr.**

21 minutes is $\frac{21}{60}$ of an hour = 21 ÷ 60 = **0·35 hr.**

2 hr 54 mins is $2 + \frac{54}{60}$ = 2 + (54 ÷ 60) = **2·9 hr**

Simple rule :- "To change minutes to a decimal => divide by 60".

1. You may use a calculator to change the following to decimals :-



(a) 36 minutes = $\frac{36}{60}$ hour (= 36 ÷ 60) = ... hour

(b) 24 minutes (c) 12 minutes (d) 42 minutes (e) 18 minutes

(f) 54 minutes (g) 15 minutes (h) 9 minutes (i) 33 minutes

2. Use your calculator to change these times to decimals giving your final answers correct to 2 decimal places :-

(a) 50 minutes (b) 13 minutes (c) 20 minutes (d) 58 minutes

(e) 40 minutes (f) 8 minutes (g) 70 minutes (h) 100 minutes

3. Use your calculator to change the following times to decimals :-

(a) 4 hours 12 minutes = $4 + \frac{12}{60}$ = 4 + (12 ÷ 60) = ... hours

(b) 2 hr 36 mins (c) 1 hrs 24 mins (d) 3 hrs 33 mins (e) 6 hrs 51 mins

(f) 3 hr 18 mins (g) 5 hrs 21 mins (h) 4 hrs 20 mins (i) 8 hrs 3 mins

Calculating Distance

Imagine you were travelling in a train at a steady speed of 80 km/hr.

can you see that :- in 1 hour, you travel $1 \times 80 = 80$ km ?

in 2 hours, you travel $2 \times 80 = 160$ km ?

in 3 hours, you travel $3 \times 80 = 240$ km ?

in other words :- **Distance (travelled) = Speed x Time**

or, using letters :- $D_{istance} = S_{peed} \times T_{ime}$

1. Use the formula **D = S x T** to calculate how far the following people travel :-

   (a) jogging at 9 km/hr for 2 hours.
   (b) driving at 40 km/hr for 3 hours.
   (c) walking at 5 km/hr for 3 hours.
   (d) running at 22 km/hr for 3 hours.
   (e) flying at 210 m.p.h. for 4 hours.
   (f) on a camel at 3 m.p.h. for 8 hours.
   (g) sailing at 18 m.p.h. for 3 hours.
   (h) in a train travelling at 90 km/hr for $1\frac{1}{2}$ hours.

2. How far did the following travel :-

   (a) a train, travelling for $1\frac{1}{2}$ hours at an average speed of 80 m.p.h. ?
   (b) a $2\frac{1}{2}$ hour walk, at an average speed of 5 m.p.h. ?
   (c) a riverboat sail lasting $3\frac{1}{2}$ hours at an average speed of 20 m.p.h. ?
   (d) a helicopter flight for 30 minutes, at an average speed of 70 km/hr ?
   (e) a rocket ship journey of 10 hours 30 minutes, at an average speed of 3000 m.p.h. ?

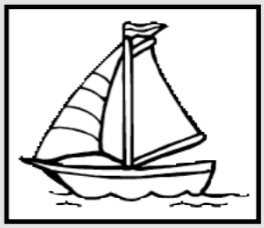
3. What was the total distance travelled by each of the following :-

   (a) a missile, going at an average speed of 2400 m.p.h., for $\frac{1}{4}$ of an hour ?

   (b) a hydrofoil, going at an average speed of 36 m.p.h., for quarter of an hour ?
   (c) a lorry, travelling at an average speed of 60 m.p.h. for 2 hours 15 minutes ?
   (d) a racing car, travelling at an average speed of 160 km/hr for 45 minutes ($\frac{3}{4}$ hour) ?
   (e) an elephant, walking at an average speed of 8 km/hr for 1 hour 45 minutes ?
   (f) a cross country runner, running at an average speed of 16 km/hr for $1\frac{3}{4}$ hours ?

Calculating Speed

Imagine you sailed 45 miles between two islands and it took 3 hours.



can you see that :- in 3 hours, you travellled 45 miles ?

=> in 1 hour, you travelled $45 \div 3 = 15$ miles

=> this means your speed was 15 miles per hour.

in other words :- **Speed = Distance ÷ Time**

or, using letters :-

$$S_{peed} = \frac{D_{istance}}{T_{ime}}$$

1. Use the formula $S = \frac{D}{T}$ to find the average speed of these journeys :-

   (a) 20 miles in 4 hours.
   (b) 45 km in 9 hours.
   (c) 220 miles in 5 hours.
   (d) 150 km in 2 hours.
   (e) 168 miles in 3 hours.
   (f) 210 km in 6 hours.

2. Calculate the average speed for each of these journeys (watch the units) :-

   (a) 50 km in 2 hours.
   (b) 350 miles in 5 hours.
   (c) 300 metres in 10 seconds.
   (d) 26 km in 4 hours.
   (e) 64 000 kilometres in 8 hours.
   (f) 1500 metres in 30 seconds.
   (g) 75 feet in 2 seconds.
   (h) 560 yards in 8 minutes.

3. Calculate the average speed of the following :-

   (a) A plane flies 1380 miles in 6 hours.
   (b) A coach covers 420 kilometres in 7 hours.
   (c) A train travels 40 miles in $\frac{1}{2}$ hour.
   (d) A marathon runner covers 24 miles in 3 hours.
   (e) A snail travels 195 cm in 3 hours.
   (f) A 38 cm icicle melts away in 4 hours.
   (g) A van travels 378 miles in 9 hours.
   (h) A bus travels 549 miles in 9 hours.

Calculating Time

Imagine you flew 800 miles to Paris and the average speed of the plane was 200 miles/hour.

Can you see that :- to travel 200 miles takes 1 hour

=> to travel 800 miles takes 800 ÷ 200 = 4 hours

In other words :- **Time = Distance ÷ Speed**

or, using letters :-

$$T_{ime} = \frac{D_{istance}}{S_{peed}}$$

1. Use the formula $T = \frac{D}{S}$ to calculate the time taken for each of these :-

   (a) driving, 40 km at 40 km/hr.
   (b) on a train, 360 miles at 60 m.p.h.
   (c) racing, 1800 m at 20 m/sec.
   (d) cycling, 180 km at 30 km/hr.
   (e) swimming, 180 m at 3 m/sec.
   (f) sliding, 45 metres at 15 m/sec.
   (g) flying at 250 km/hr for 1000 km.
   (h) sailing at 15 m.p.h. for 75 miles.

2. Change these times into hours and minutes :-

   (a) $2\frac{1}{2}$ hours (b) $5\frac{1}{4}$ hours (c) $3\frac{3}{4}$ hours (d) 6·5 hours
   (e) 8·25 hours (f) 3·5 hours (g) 1·75 hours (h) 0·25 hours.

3. 1 hour 30 minutes is $1\frac{1}{2}$ or 1·5 hours; 4 hour 15 minutes is $4\frac{1}{4}$ or 4·25 hours.

   Change the following times to both fractions of an hour and decimal form :-

   (a) 2 hours 30 minutes.
   (b) 4 hours 15 minutes.
   (c) 3 hours 45 minutes.
   (d) 2 hour 15 minutes.
   (e) 5 hours 30 minutes.
   (f) 8 hours 45 minutes.

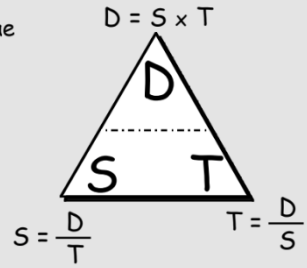
4. Use the formula $T = \frac{D}{S}$ to calculate the time (*give answers in **hrs and mins***).

   (a) driving, 90 km at 60 km/hr.
   (b) sailing, 25 miles at 20 m.p.h.
   (c) flying, 350 km at 200 km/hr.
   (d) running, 6 km at 12 km/hr.
   (e) train journey, 180 km at 80 km/hr.
   (f) driving, 55 miles at 44 m.p.h.
   (g) missile fired at 1200 km/hr for 300 km.
   (h) flying at 240 m.p.h. for 660 miles.

Time, Distance, Speed Problems

In the previous 3 exercises, you learned how to use three formulae to calculate the speed, the distance or the time for a journey.

The triangle opposite shows a simple way of remembering how to use each of the three formulae. Try to memorise its shape.



Example. David drove from his house to the coast, a distance of 135 miles. It took him 2 hrs 15 mins to do so. Calculate David's average **speed**.

From the triangle, we can see that $S = \frac{D}{T}$

$$\Rightarrow \quad S = \frac{135}{2\text{hr } 15\text{min}} = \frac{135}{2{\cdot}25} = 60 \text{ m.p.h.}$$

Remember – Time must always be entered into a calculator as a decimal

Minutes => Decimals =>

48 minutes is $\frac{48}{60}$ of an hour = 48 ÷ 60 = **0·8 hr.**

21 minutes is $\frac{21}{60}$ of an hour = 21 ÷ 60 = **0·35 hr.**

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Simple rule :- "To change minutes to a decimal => divide by 60".

1. (a)

Distance	Speed	Time
360 km	?	8 hours

(b)

Distance	Speed	Time
120 miles	30 m.p.h.	?

(c)

Distance	Speed	Time
?	37 m.p.h.	3 hrs

(d)

Distance	Speed	Time
140 km	?	$3\frac{1}{2}$ hours

(e)

Distance	Speed	Time
?	20 m/sec	$3\frac{1}{2}$ secs

(f)

Distance	Speed	Time
225 miles	100 m.p.h.	?

2. Dougal drove for half an hour and covered a distance of 18 km.

What was the Dougal's average speed ?

3. 

A helicopter flew 75 km at an average speed of 60 km per hour.

For how long was the helicopter flying ?

4. When the McPherson's towed their caravan on holiday, they maintained an average speed of 38 km/hr. The trip took $3\frac{1}{2}$ hours.

How far was it from home to their holiday resort ?

5. A GNER train left Edinburgh Waverly at 0915 and arrived at its destination at 1145.

If the train travelled 175 miles, what was the its average speed ?

6. 

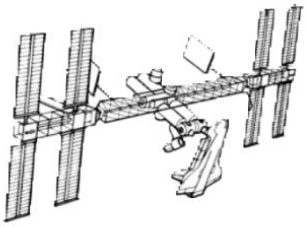
A hill walker is crossing the valley at an average speed of 8 km/hr.

How long will it take him to walk the whole length of the valley which is 14 km long ?

7. A space station goes round the moon at an average speed of 3200 km/hr.

It takes $3\frac{1}{2}$ hours to complete its orbit.

What is the length of the space station's orbit ?



8. 

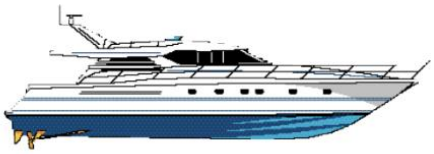
It took old Mrs Hubbard 30 minutes to walk the $1\frac{1}{2}$ miles to the post office to collect her pension.
Now, with the aid of her electric chair, she can do it in 15 mins.

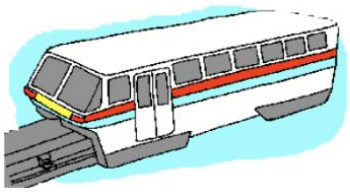
(a) Calculate Mrs Hubbard's speed when she walked.

(b) How much **faster** does she travel in the chair ?

9. The Halliday's took $4\frac{1}{2}$ days to sail round the islands in their cruiser.

If they covered an average of 80 miles per day, what was the total distance they covered on their trip ?



10. 

The monorail in Sydney travels at a speed of 250 metres per minute around its circular route.

How long does it take to cover its route if the circuit is 2250 metres long ?

11. Of the three drivers below, who was travelling fastest ?

- David, who covered 12 miles in 15 minutes .
- Andy, who covered 9 miles in 10 minutes .
- Brian, who covered 17 miles in 20 minutes .

12. A rally driver covered the first stage (105 km) in 1 hour 30 minutes, the second stage (100 km) in 1 hr 15 mins and the final stage (75 km) in three quarters of an hour.

(a) Calculate his average speed for each of the 3 stages.

(b) Calculate his average speed for the whole race.

Additional Worksheet – speed, distance, time – Corbett Maths
https://corbettmaths.com/wp-content/uploads/2018/09/Speed-Distance-Time-pdf.pdf