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

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

$$Distance = Speed \times Time.$$

Distance = Speed × time is a linear equation
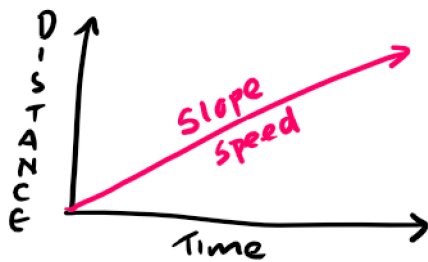
Eg 1) A train leaves Belfast at 8.40am and arrives to Dublin at 10.25am. The distance of this journey is 168km. Find the average speed of the train in km/hr.

$$\overset{+60}{Time \quad 10.25} \qquad Borrow \ 1 \ hour \ and \ add \ 60 \ to \ minutes.$$
$$-8.40$$

$$9.85$$
$$-8.40$$
$$\overline{1.45}$$

1hr 45 mins

Calculator [·,,,]

10[·,,,]25[·,,,]
10° 25°

$$S = \frac{D}{T} = \frac{168}{1.\underset{\bigcirc}{45}} \longrightarrow$$ Convert to hours.

45 min → hours

$$\frac{45}{60} = ·75$$

168

$$\frac{}{60} = .75$$

Speed: $\dfrac{168}{1.75} = 96 \text{ km/hr}.$

NOTE: To convert minutes to hours, divide the minutes by 60

Time: To convert hours to minutes, multiply the minutes by 60

15 mins → hours
$$15/60 = 1/4 \text{ or } .25$$

30 mins → hours
$$30/60 = 1/2 \text{ or } .5$$

Pg 126 Q1- 11

T&T3 5.8

T&T3
5.8.pptx

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chapter

5 Arithmetic

Section 5.8 **Speed – distance – time**

Example 1

A motorist travelled 500 kilometres in 6 hours.
Her average speed for the first two hours was 100 km/hr.
Find her average speed in kilometres per hour for the last four hours.

Exercise 5.8

1. A train travels at 60 km/hr for two hours and then at 90 km/hr for one hour.
Find its average speed over the three hours.

$$\text{Distance} \quad \begin{array}{r} 120\text{km} \\ + 90\text{km} \\ \hline 210\text{km} \end{array}$$

$$\text{Time} \; 2+1 = 3\text{hrs}$$

$$S = D/T = \frac{216}{3} = 70\text{km/hr}$$

2. A journey takes 3 hours at an average speed of 120 km/hr.
How long, in hours, will the journey take if the average speed is reduced to 80 km/hr?

$$D = S \times T$$

$$120 \times 3 = 360 km$$

$$T = \frac{D}{S} \qquad \frac{360}{80} = 4.5 \qquad .5 \times 60 = 30 mins$$

Ans 4hr 30 mins

3. Calculate the average speed, in km per hour, of a train that travels
   (i) 240 km in 2 hours **120** (ii) 336 km in 3 hours **112** (iii) 68 km in $\frac{1}{2}$ hour **136**
   (iv) 392 km in $3\frac{1}{2}$ hours **112** (v) 32 km in 15 minutes **128** (vi) 90 km in 40 minutes. **135**

4. The diagram shows a coach journey between Dublin and Tralee.

Dublin   190 km   Limerick   120 km   Tralee

08:30   11:00   13:15

  (i) Calculate the average speed of the coach between Dublin and Limerick.

  (ii) Calculate the average speed between Limerick and Tralee.

  (iii) Calculate the average speed between Dublin and Tralee.
        Give your answer correct to the nearest whole number.

i) $\dfrac{190}{2.5}$ = 76 km/hr

ii) $\dfrac{120}{2.25}$ = 53·$\dot{3}$

iii) $\dfrac{310}{4.75}$ = 65 km/hr

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5. A journey of 276 km began at 1040 hrs and ended on the same day at 1430 hrs.
Find the average speed in km/hour.

Time 3 $\dfrac{50}{60}$

Distance 276

Speed = $\dfrac{276}{3\,\frac{50}{60}}$ = 72 km/hr.

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6. How far will a car travel
  (i)   in 3 hours at an average speed of 80 km/hr?
  (ii) in 4 hours at an average speed of 65 km/hr?
  (iii) in $2\frac{1}{4}$ hours at an average speed of 88 km/hr?

H/W   Pg 128 Q6→11.

7. Find the time taken to travel
  (i)   210 km at an average speed of 70 km/hr
  (ii) 200 km at an average speed of 80 km/hr
  (iii) 20 km at an average speed of 60 km/hr.

8. It takes 4 hours and 20 minutes to travel a journey at an average speed of 120 km/hr. How many hours and minutes will it take to travel the same journey if the average speed is reduced to 100 km/hr?

9. A motorist travelled 320 km in five hours.
   Her average speed for the first 160 km was 80 km/hr.
   What was her average speed for the second 160 km?

10. A distance of 18 km is travelled in 25 minutes.
Find the average speed in metres per second.

11. A train leaves Cork at 09:05 and arrives in Dublin at 12:25.
The distance from Cork to Dublin is 250 km.
Find the average speed of the train in km/h.

12. A hydrofoil travels a distance of 48 km at a speed of 36 km/h.
Calculate the journey time
(i) in hours, using fractions   (ii) in hours and minutes

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13. A ferry travels a distance of 51.6 km at a speed of 24 km/h.
How long does the journey take, in hours and minutes?

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14. A tiger runs at a speed of 50 kilometres per hour for 9 seconds.
How many metres does the tiger run?

15. Eamonn took 46 minutes to jog a distance of 6.4 km.
Calculate his average speed in km/hr, correct to 1 decimal place.
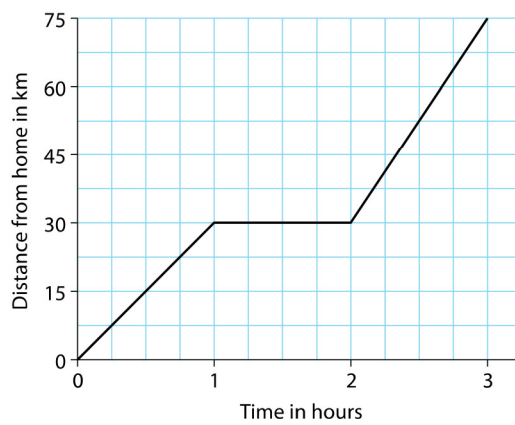
16. Anne walks a distance of 1.7 km to school from home.
She walks at an average speed of 5.1 km/hr.
What is the latest time she can leave home to be in school at 8.55 a.m.?

17. The distance–time graph given shows Emer's 3-hour journey.

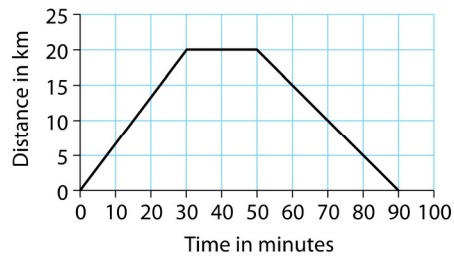(i)   How far did she travel in the first hour?

(ii)   For how long was she stopped?

(iii)   How far did she travel in the third hour?

(iv)   What was the total length of the journey?

18. This graph shows the journey of a tourist train running between two stations.

   (i)   How far apart are the two stations?
   (ii) What is the speed of the train, in km per minute, on the outward journey?
   (iii) What is this speed in km per hour (km/h)?
   (iv) What is the speed of the train, in km/h, on the return journey?

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19. The graph below shows the distance travelled by a bus and also the time taken for a completed journey. The bus started the journey at 12.00 hours and finished the journey at 15.00 hours.
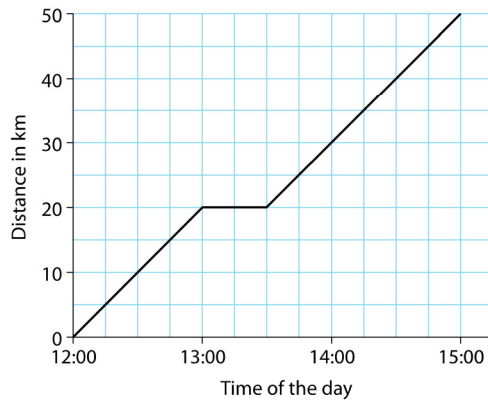
   (i)   How far did the bus travel in the first hour?
   (ii) For how long did the bus stop?
   (iii) How far did the bus travel between 13.30 and 15.00?
   (iv) How much time passed when travelling from a point 10 km from the start to a point 40 km from the start?
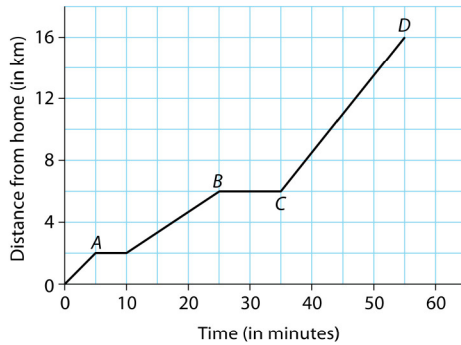
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20. The travel graph below shows Mr McLoone's journey by car from home to work.

At *A*, he stops to buy a newspaper.
At *B*, he stops to buy petrol.
At *D*, he arrives at work.

(i)   How long does the journey take?
(ii) For how long does Mr McLoone stop to buy petrol?
(iii) What is the car's average speed from *C* to *D*?
(iv) Excluding the two stops, what was the car's average speed for the whole journey?

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21. The solid line is the distance–time graph of a model car.

(i)   What is the speed, in metres per second, of the car during the first 2 seconds?
(ii) What happens to the speed of the car 2 seconds from the start?
(iii) What is the speed after that?
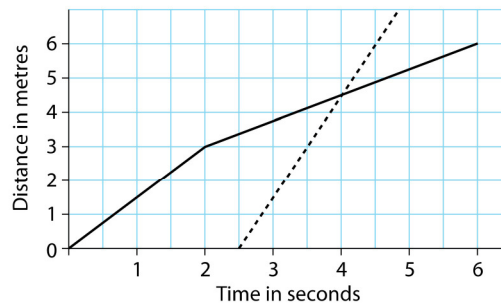
The dotted line is the distance–time graph of another model car.
(iv) What is the speed of the second car?
(v)   For how long is the second car travelling before it overtakes the first?

A third model car starts 4.5 seconds after the first and overtakes it 1.5 seconds later.
(vi) What is the speed of the third car?

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1. 70 km/hr
2. $4\frac{1}{2}$ hours
3. (i) 120 km/hr (ii) 112 km/hr
   (iii) 136 km/hr (iv) 112 km/hr
   (v) 128 km/hr (vi) 135 km/hr
4. (i) 76 km/hr (ii) $53\frac{1}{3}$ km/hr
   (iii) 65 km/hr
5. 72 km/hr
6. (i) 240 km (ii) 260 km (iii) 198 km
7. (i) 3 hr (ii) $2\frac{1}{2}$ hr (iii) 20 min
8. 5 hr 12 min
9. $53\frac{1}{3}$ km/hr
10. 12 m/s
11. 75 km/hr
12. (i) $1\frac{1}{3}$ hr (ii) 1 hr 20 min
13. 2 hr 9 min
14. 125 m
15. 8.3 km/hr
16. 8.35 am
17. (i) 30 km (ii) 1 hour
    (iii) 45 km (iv) 75 km
18. (i) 20 km (ii) $\frac{2}{3}$ km/min
    (iii) 40 km/hr (iv) 30 km/hr
19. (i) 20 km (ii) 30 min
    (iii) 30 km (iv) 2 hours
20. (i) 55 min (ii) 10 min
    (iii) 30 km/hr (iv) 24 km/hr
21. (i) $1\frac{1}{2}$ m/s (ii) It reduces
    (iii) $\frac{3}{4}$ m/s (iv) 3 m/s
    (v) $1\frac{1}{2}$ sec (vi) 4 m/s