TOPIC 11: TIME

TIME

Time is a measure of duration.

Study equivalent measure of time

60 Seconds (60s)	=	1 minute (1 min)	366 days	=	1 leap year .
60 minutes or 3600s	=	1 hour (1h)	52 weeks	=	1 year
24 hours	=	1 day	12 months	=	1 year
14 days	=	1 fortnight	10 years	=	1 decade
$365\frac{1}{4}$ days	=	1 ordinary year	100 years	=	1 century
			1000 years	=	1 millennium

Telling time on the clock face using a.m or p.m

Example 1

A mathematics morning lesson started at the time shown on the clock face below.
At what time did the lesson begin?

At 25 minutes past 10a.m ***or*** 10:25a.m

Example 2

What time is it in the afternoon?

It is 20 minutes to 2p.m ***or*** 1:40p.m

Exercise

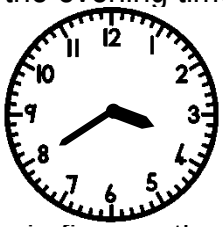
1. Tell the morning time in figures.

a) 

b) 

c 

2. Tell the evening time in words.

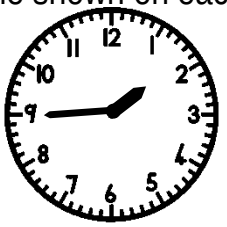
a) 

b) 

c) 

3. Write in figures, the afternoon time shown on each of the clock faces below.

a) 

b) 

c) 

4. Write the time shown on the digital clocks below in words.

a) 

b) 

c) 

5. Write in figures.
   a) Twelve minutes past eleven in the morning.
   b) Twenty five minutes past six in the evening.
   c) Seventeen minutes past eight in the evening.
   d) Twenty nine minutes past nine in the morning.
   e) A half past seven in the afternoon.
   f) A quarter past ten in the evening.
   g) Twenty eight minutes to three in the afternoon.
   h) Ten minutes to four in the morning.
   i) A quarter to seven in the afternoon.
   j) Fourteen minutes to midnight.
   k) Twenty minutes to noon.
6. A lesson ended at a quarter to 9 in the morning. Write the time at which the lesson ended in figures.

Changing hours to minutes

Example 1

Change 6 hours to minutes.

1 hour = 60 minutes

6 hours = 6 × 60 minutes

= 360 minutes

Example 2

Change $4\frac{1}{4}$ hours into minutes.

1 hour = 60 minutes

$4\frac{1}{4}$ hours = $\frac{17}{4}$ × 60 minutes

$4\frac{1}{4}$ hours = 255 minutes

Exercise

1. Change the following into minutes.

a)	4 hours	e)	$1\frac{1}{2}$ hours	i)	$2\frac{1}{4}$ hours
b)	15 hours	f)	$3\frac{1}{2}$ hours	j)	$1\frac{1}{5}$ hours
c)	7 hours	g)	$6\frac{1}{2}$ hours	k)	$6\frac{2}{3}$ hours
d)	12 hours	h)	$9\frac{1}{2}$ hours	l)	$10\frac{3}{4}$ hours

2. A mathematics test took $2\frac{1}{2}$ hours. How long did it take in minutes?
3. Children took $1\frac{1}{6}$ hours doing their homework. How many minutes did they take?
4. The staff meeting took $2\frac{5}{6}$ hours. How many minutes did it take?
5. Musomi took $1\frac{1}{2}$ hours revising mathematics and $\frac{3}{4}$ hours revising science. For how long did he revise in minutes?
6. Muyonjo took $\frac{2}{3}$ hours cleaning the compound and $2\frac{1}{4}$ hours washing his clothes. Express the time the two activities took in minutes.
7. The teachers took $1\frac{1}{5}$ hours addressing pupils about dangers of early marriage. Express the time they took in minutes.
8. It took a driver $1\frac{5}{12}$ hours to travel from town X to town Y and $2\frac{3}{5}$ hours from town Y to town Z. Find in minutes, the time taken by the driver to travel from town X to town Z.

Changing minutes to seconds

Example 1

How many seconds are there in 15 minutes?

1 minute = 60 seconds

15 minutes = 15 × 60 seconds

= 900 seconds

Example 2

Change $2\frac{1}{2}$ minutes to seconds.

1 minute = 60 seconds

$2\frac{1}{2}$ minutes = $\frac{5}{2}$ × 60 seconds

= 150 seconds

Exercise

1. Change the following into seconds.

a)	6 minutes	f)	2 minutes	k)	$6\frac{1}{2}$ minutes
b)	5 minutes	g)	25 minutes	l)	$3\frac{1}{4}$ minutes
c)	10 minutes	h)	20 minutes	m)	$1\frac{1}{5}$ minutes
d)	7 minutes	i)	38 minutes	n)	$8\frac{2}{3}$ minutes
e)	8 minutes	j)	72 minutes	o)	$7\frac{1}{4}$ minutes

2. Solomon took $\frac{1}{3}$ minutes to complete a 100 metre race. How many seconds did he take?
3. A wheel takes $\frac{1}{20}$ minutes to make 1 revolution. How many seconds will it take to make 40 revolutions?

4. Musoke took $2\frac{3}{5}$ minutes to drink a bottle of soda. How long did he take in seconds?
5. Vivian takes $4\frac{2}{5}$ minutes to run around the school compound. How many rounds does she make if she runs for 6600 seconds at the same speed?
6. A car wheel made 200 revolutions in $1\frac{1}{2}$ minutes. How many revolutions would it make in 460 seconds at the same speed?
7. A factory has a machine that produces forty 50g nails in $3\frac{3}{4}$ minutes. One day, the machine operated for 3600 seconds. The nails were packed in sacks of 8kg and sold at sh. 52,000 each. How much money was collected then?

Changing hours to seconds

Example 1

Change 3 hours to seconds.

1 hour = 3600 seconds

3 hours = 3 × 3600 seconds

= 10800 seconds

Example 2

Change $9\frac{1}{4}$ hours to seconds.

1 hour = 3600 seconds

$9\frac{1}{4}$ hours = $\frac{37}{4}$ × 3600 seconds

= 33300 seconds

Exercise

1. Change the following into seconds.

a)	2 hours	d)	8 hours	e)	15 hours	i)	$2\frac{1}{4}$ hours
b)	3 hours	f)	12 hours	h)	36 hours	j)	$6\frac{3}{8}$ hours
c)	9 hours	g)	24 hours	l)	$12\frac{2}{5}$ hours	k)	$5\frac{3}{4}$ hours

2. Mukiga dug for $3\frac{1}{2}$ hours. For how long did he dig in seconds?
3. A bus took $4\frac{1}{6}$ hours to travel from Kampala to Bukomansimbi via Gomba. How long was the journey in seconds?
4. Munafu slept for 8 hours 50 minutes. For how many seconds did he sleep?

Changing seconds to minutes

Example 1

Change 240 seconds into minutes.

60 seconds = 1 minute

1 second = $\frac{1}{60}$ minutes

240 seconds = $\frac{1}{60}$ × 240 minutes

= 4 minutes

Example 2

Change 500 seconds into minutes.

60 seconds = 1 minute

1 second = $\frac{1}{60}$ minutes

500 seconds = $\frac{1}{60}$ × 500 minutes

= $8\frac{1}{3}$ minutes

Exercise

1. Change the following in minutes.

a)	180s	d)	420s	g)	200s
b)	600s	e)	720s	h)	1000s
c)	300s	f)	900s	i)	800s

2. Muddusi took 700 seconds to run from point X to point Y. How long did he take in minutes?
3. A wheel makes 1 complete revolution in 12 seconds. Express this in minutes.

Changing minutes to hours

Example 1

Change 180 minutes to hours.

60 seconds = 1 hour

1 minute = $\frac{1}{60}$ hours

180 minutes = $(\frac{1}{60} \times 180)$ hours

= 3 hours

Example 2

Change 700 minutes into hours.

60 minutes = 1 hour

1 minute = $\frac{1}{60}$ hours

700 minutes = $(\frac{1}{60} \times 700)$ hours

700 minutes = $11\frac{2}{3}$ hours

Exercise

1. Express the given minutes as hours.

a)	300 min	e)	360 min	i)	130 min
b)	900 min	f)	480 min	j)	400 min
c)	120 min	g)	1200 min	k)	800 min
d)	600 min	h)	270 min	l)	1000 min

2. Josephine spent 80 minutes while washing and 280 minutes digging. How many hours did she spend doing the two activities?

Changing minutes into hours and minutes

Example 1

Change 450 minutes into hours and minutes.

60 minutes = 1 hour

1 minute = $\frac{1}{60}$ hours

450 minutes = $(\frac{1}{60} \times 450)$ hours

= $\frac{450}{60}$

450 minutes = 7 hours 30 minutes

Example 2

Express 710 minutes as hours and minutes.

60 minutes = 1 hour

1 minute = $\frac{1}{60}$ hours

710 minutes = $(\frac{1}{60} \times 710)$ hours

= $\frac{710}{60}$

710 minutes = 11 hours 50 minutes

Exercise

Express the given minutes as hours and minutes.

a)	100 minutes	e)	170 minutes	i)	1000 minutes
b)	70 minutes	f)	212 minutes	j)	317 minutes
c)	85 minutes	g)	460 minutes	k)	836 minutes
d)	125 minutes	h)	705 minutes	l)	530 minutes

Changing seconds into hours

Example 1

Change 14400 seconds into hours.

3600 seconds = 1 hour

1 second = $\frac{1}{3600}$ hours

14400 seconds = $(\frac{1}{3600} \times 14400)$ hours

= 4 hours

Example 2

Express 18720 seconds into hours.

3600 seconds = 1 hour

1 second = $\frac{1}{3600}$ hours

18720 seconds = $(\frac{1}{3600} \times 18720)$ hours

= $5\frac{1}{5}$ hours

Exercise

1. Change the following into hours.

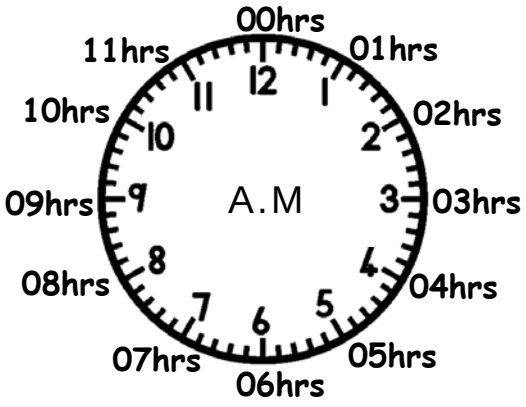
a)	36000s	e)	90000s	j)	9000s
b)	7200s	f)	25200s	j)	15300s
c)	10800s	g)	32400s	k)	13500s
d)	18000s	h)	43200s	l)	11400s

THE 24 HOUR CLOCK

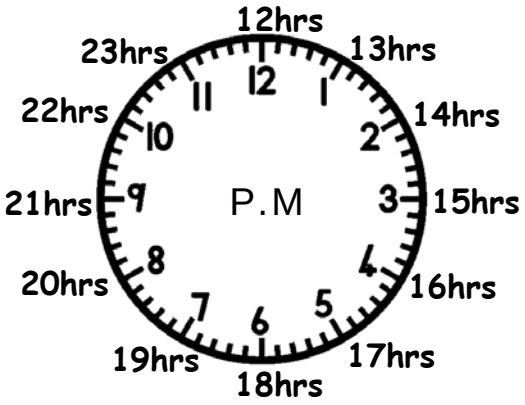
The 24-hour clock is the way of telling the time using all 24 hours in a day. (From midnight to midnight) This is indicated by the hours (and minutes) passed since midnight. The 24-hour clock is more often shown on digital clocks and written in a 4-digit form, with the first two digits representing the hour and the last two digits representing the minutes.

Study the clocks below.

Morning (A.M)



Afternoon / Evening (P.M)



Expressing 12 hour clock time into 24 hour clock time

Example 1

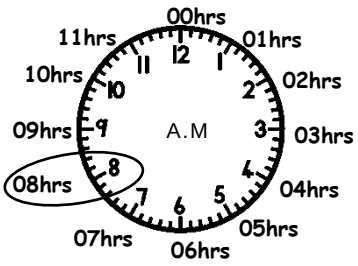
Change 8:45a.m into 24 hour clock.

Method 1

8 : 45
+00 00
08 45 hours

8:45a.m = 08 45 hours

Method 2



8:45a.m = 08 45 hours

Example 2

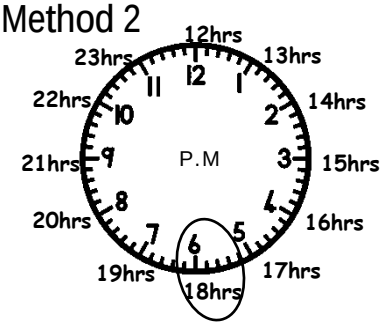
Change 6:20p.m to 24 hour clock.

Method 1

6 : 20
+12 00
18 20 hours

6:20p.m = 18 20 hours

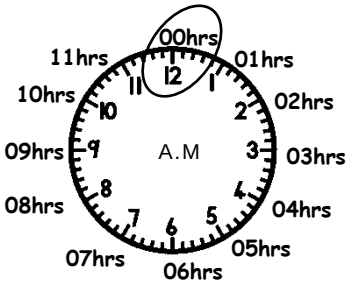
Method 2



6:20p.m = 18 20 hours

Example 3

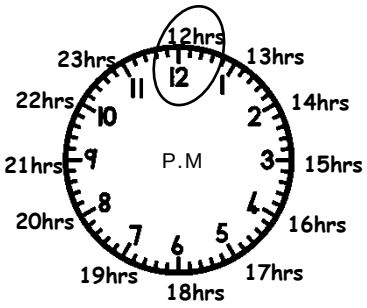
Change 12:05a.m to 24 hour clock.



12:05 a.m = 00 05 hours

Example 4

Change 12:49p.m to 24 hour clock.



12:05 a.m = 00 05 hours

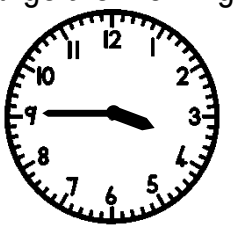
Exercise

1. Change to 24 hour clock system.

a)	7:00a.m	e)	9:00p.m	i)	12 mid night	m)	12 noon
b)	11:00a.m	f)	6:15am	j)	12:10a.m	n)	12:12p.m
c)	3:17a.m	g)	4:33p.m	k)	12:38a.m	0)	12:30p.m
d)	8:40a.m	h)	10:23p.m	l)	12:08a.m	p)	12:28p.m

2. A science lesson started at 11:05a.m. Express this time in 24 hour clock.

3. Kalungi went to the garden at 15 minutes to 9 in the morning. Express this time in the 24 hour clock system.
4. A birth day party ended at 25 minutes to midnight. At what time did it end in 24 hour clock system?
5. Candidates finished their last paper at 4:15p.m. Write this time in 24 hour clock
6. Results for candidates who sat for PLE last year were released at 1:42p.m. At what time were the results released in 24 hour clock?
7. Katale went to the market 12 minutes to noon. Express this time in 24 hour clock.
8. A bus arrived at Arua at 12:35a.m. Change this time into 24 hour clock system.
9. Moslems went to the mosque at 25 minutes past noon. Convert this time into 24 hour clock system.
10. A baby slept at 12:56p.m. Change the time at which the baby slept in 24 hour clock.
11. Change the morning time shown on each of the clock faces below in 24 hour clock.

a)  b)  c) 

12. Convert to 24 hour clock, the time shown on each of the clock faces below.

a)  b)  c) 

Expressing 24 hour clock time into 12 hour clock time

Example

Express to 12 hour clock.

a) 0923 hours	b) 2145hrs	c) 0025 hours	d) 1236hours
09 23 - 00 00 9 : 20a.m	21 45 - 12 00 9:45p.m	0025hours = 12:25a.m	1236hours = 12:36p.m

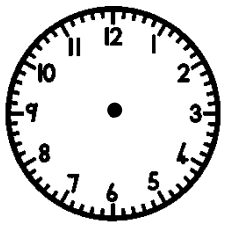
Exercise

1. Change to 12 hour clock.

a) 0834hours	e) 1300hours	i) 0200hours	m) 1200hours
b) 0300hours	f) 2319hours	j) 0018hours	n) 1230hours
c) 0415hours	g) 1935hours	k) 0003hours	o) 1226hours
d) 1143hours	h) 1506hours	l) 0048hours	p) 1205hours

2. A train left the station at 0915 hours. Change the time it left the station in 12 hour clock system.

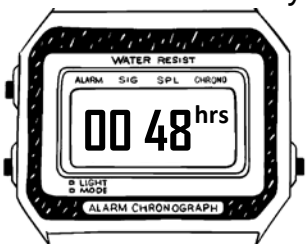
3. Pupils went to school at 0712 hours. What time was it in 12 hour clock system?
4. Bukirwa woke up at 0658 hours. Change this time to 12 hour clock system.
5. Ochan started playing football at 1520 hrs. Convert this time into 12 hour clock system.
6. Tulo went to sleep at 2138 hours. What time on a 12 hour clock did she go to sleep?
7. The time on the 24 hour clock is 1718 hours. What time will it be on a 12 hour clock?
8. Our evening preps always end at 2245hours. Express that time on a 24 hour clock.
9. An examination ended at 1230hours . What time is it on the 12 hour clock?
10. It started raining at 0032hours. Write this time in 12 hour clock system.
11. Below is a clock face. Use it to answer the question that follows.



On the clock face above, show the 12 hour clock equivalent to;

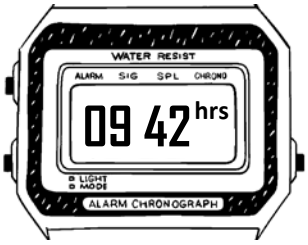
a) 2115hours
b) 0940hours
c) 0410hours
d) 1235hours
e) 1355hours
f) 0020hours
g) 0705hours
h) 1050hours
i) 1740hours
j) 2325hours
k) 1830hours
l) 1745hours

12. Convert the time shown by the digital watches into 12 hour clock system.

a) 

b) 

c) 

d) 

e) 

f) 

Adding hours and minutes

Example 1

Work out:

Hours	Minutes
6	40
+ 3	54
10	34

40 + 54 = 95

96 ÷ 60 = 1 remainder 34

Example 2

Work out:

Hours	Minutes
1	36
+ 3	28
4	04

36 + 28 = 64

64 ÷ 60 = 1 remainder 4

Exercise

1. Work out:

a)

Hrs	Min
5	30
+ 2	30

b)

Hrs	Min
2	40
+ 4	20

c)

Hrs	Min
6	50
+ 1	20

d)

Hrs	Min
3	40
+ 4	35

e)

Hrs	Min
1	17
+ 3	58

f)

Hrs	Min
3	50
+ 9	40

g)

Hrs	Min
5	30
+ 6	34

h)

Hrs	Min
4	50
+ 7	58

i)

Hrs	Min
2	46
+ 3	32

2. Mahad took 2 hours 30 minutes and 1 hour 48 minutes writing notes. Find in hours and minutes, the time he spent doing the two activities.
3. Pupils took 1 hour 16 minutes cleaning the school compound and 75 minutes mopping the classroom. For how long did they do the two activities?

Finding the ending time

Example 1

A forty mathematics lesson started at 8:35a.m. At what time did it end?

8 : 35	35 + 40 = 75
+ 40	75 ÷ 60 = 1 remainder 15
9 : 15 a.m	

It ended at 9:15 a.m

Example 2

A meeting started at 10:52 a.m. It lasted for $2\frac{2}{3}$ minutes. At what time did it end?

$\frac{2}{3} \times 60 = 40$ minutes

$2\frac{2}{3}$h = 2 hours 40 minutes

10 : 52	52 + 40 = 92
+ 2 : 40	92 ÷ 60 = 1 rem 32
13 : 32	

13 32 hours to 12 hour clock system

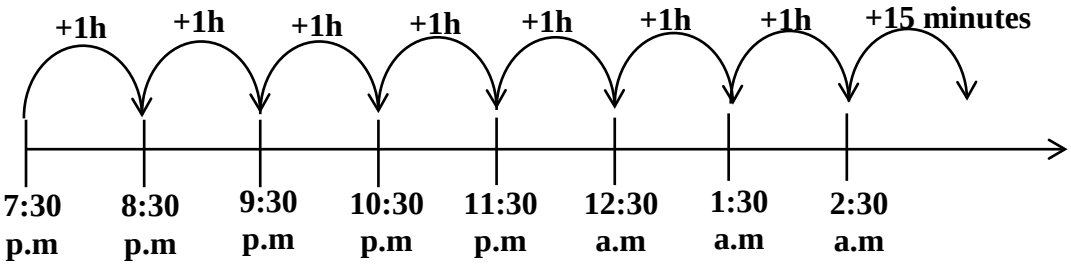
13 : 32
- 12 : 00
1 : 32 p.m

The meeting ended at 1:32 p.m

Example 3

A bus left Kampala for Arua at 7:30 p.m. It reached Arua after $7\frac{1}{4}$ hours. At what time did the bus reach Arua?

$7\frac{1}{4}$ hours = 7 hours 15 minutes



2 : 30
\+ 15
2 : 45 a.m

The bus reached Arua at 2:45a.m

Exercise

1. It took a girl 15 minutes to mop her bedroom. If she started at 8:20a.m, at what time did she finish?
2. Candidates took $2\frac{1}{2}$ hours writing a mathematics test which they started at 8:30a.m. At what time did they finish?
3. A woman went sleeping at 2:20pm. She slept for 3 hours 49 minutes. At what time did she wake up?
4. A football match which lasted for $1\frac{3}{4}$ hours started at 4:45p.m. At what time did it end?
5. A fifty five minute activity started at 11: 40a.m. At what time did it end?
6. A forty minute lesson started at 11:20a.m. At what time did it end?
7. A birthday party that started at 8:42p.m lasted for 3 hours 18 minutes. Find the time at which the birthday party ended.
8. Mukiga went to the garden at 6:20a.m. He dug for $5\frac{3}{4}$ hours. At what time did he leave the garden?
9. Kabode started his evening work at 6:50 p.m. He went to sleep after working for $2\frac{5}{6}$ hours. At what time did he sleep?
10. If a concert started at 11:45a.m and lasted for 2 hours 50 minutes, what time did the concert end?
11. A party started at 4:30pm and lasted for $2\frac{3}{4}$ hours. At what time did the party end?

12. A minute hand of a clock makes $2\frac{1}{4}$ revolutions to cover the time of the science examination. If the exam starts at 10:45a.m, at what time will it end?
13. Zedriga drove for $2\frac{2}{3}$ hours from Town A to town B. If she left town A at 1:50p.m, at what time did she reach town B?
14. Barbie went to sleep at 22 30 hours. She slept for $8\frac{1}{2}$ hours. At what time did she wake up?

Finding starting time

Starting time = Ending time - Duration

Example 1

A debate which took $1\frac{1}{3}$ hours ended at 5:10 p.m. At what time did it start?

$\frac{1}{3} \times 60\text{min} = 20$ minutes

$1\frac{1}{3}$ hours = 1 hour 20 minutes

$$\begin{array}{r} 5:10 \\ -\ 1:20 \\ \hline 3:50\text{ p.m} \end{array}$$

It started at 3:50 p.m

Example 2

A forty five minute lesson ended at 1:30 p.m. At what time did the lesson start?

$$\begin{array}{r} 1:30 \\ +\ 12:00 \\ \hline 13:30 \end{array}$$

$$\begin{array}{rl} 13:30 & 30 + 60 = 90 \\ -\ \ 45 & 90 - 45 = 45 \\ \hline 12:45\text{ p.m} & \end{array}$$

The lesson started at 12:45 p.m

Exercise

1. Cate spent 1 hour 20 minutes cleaning her room. If it was 9:30a.m when she finished, what time was it when she started?
2. Nseko spent 2 hours 55 minutes playing video games. If he stopped to revise his books at 4:50p.m, at what time did he start playing?
3. I slept for 2 hours 40 minutes. I woke up at 6:10p.m. At what time did I sleep?
4. The school football game ended at 1:30p.m. If the game lasted for 1 hour 30 minutes, what time did it start?
5. A famer spent $2\frac{1}{2}$ hours looking for his missing goat. He finally found it at 7:20p.m. What time was it when he started looking for the goat?
6. A meeting which ended at 1:15p.m took 160 minutes. At what time did it start?
7. It took a cyclist $2\frac{1}{4}$ hours to travel from town X to town Y. He reached town Y at 1:30 p.m. At what time did the cyclist leave town X?
8. A foot baller finished jogging at 1:10p.m. If he had been jogging for 55 minutes, what time was it when he started?

9. Kanaabe spent 2 hours 15 minutes cleaning a truck. He finished cleaning it at 2:05 p.m. At what time did he start cleaning the truck?
10. Joseph slept for $6\frac{1}{2}$ hours. He woke up at 6:15 a.m. At what time did he sleep?
11. A thanks giving ceremony lasted for $7\frac{2}{5}$ hours. It ended at 6:15p.m. At what time did it begin?
12. Obed reached Yumbe at 06 15 hours after travelling for 8 hours 30 minutes. At what time did he start his journey?
13. Kagoye took $2\frac{1}{2}$ hours washing his clothes. If he finished at 13 20 hours, at what time did he start?

Finding duration

We calculate the duration of an activity if we know the starting and ending time.
***Duration** is the difference between the ending time and the starting time.*

Example 1

The morning assembly in a school begins at 7:45a.m and ends at 8:15a.m. How long does it take?

Hrs	Min	
8	15	60 + 15 = 75
- 7	45	75 – 45 = 30
0	30	

The assembly takes 30 minutes.

Example 2

A village meeting started at 2:35p.m and ended at 6:20pm. How long was the meeting?

Hrs	Min	
6	20	60 + 20 = 80
- 2	35	80 – 35 = 45
3	45	

The meeting took 3 hours 35 minutes

Example 3

A family party started at 8:25p.m and ended at 1:20a.m. For how long did it last?

Hrs	Min
12	00
- 8	25
3	35

Hrs	Min
3	35
+1	20
4	55

It lasted for 4 hours 55 minutes.

Example 4

How many hours are there between 11:40a.m and 2:20pm?

Hrs	Min
12	00
- 11	40
0	20

Hrs	Min
0	20
+ 2	20
2	40

$(\frac{40}{60})$ hours = $\frac{2}{3}$ hours

2 hours 40 minutes = $2\frac{2}{3}$ hours

Exercise

1. Julie worked from 2:15p.m to 4:30p.m. For how long did she work?
3. An examination started at 9:00a.m and ended at 11:30a.m. How long was the examination?

2. How many hours are there between

a)	8:30a.m to 10:30a.m?	g)	9:00a.m to 2:24p.m?
b)	7:15a.m to 11:45a.m?	h)	11:30a.m to 1:45p.m?
c)	9:45p.m to 11:20p.m?	i)	8:30p.m to 12 mid night?
d)	1:55p.m to 4:25p.m?	j)	9:30p.m to 12:30a.m?
e)	10:20a.m to 12:00 noon?	k)	7:55p.m to 12:35a.m?
f)	11:45a.m to 12:15p.m?	l)	10:45p.m to 3:15a.m?

4. A meeting started at 3:45p.m and ended at 5:00 pm. How many hours did the meeting take?
5. A lesson started at 11:40a.m and ended at 1:45p.m. How long did the lesson take?
6. It is 11:15am, how long is it until 2:20p.m?
7. It is 12:30p.m. It has been raining since 8:15a.m. Find the time it has taken raining.
8. Study and complete the table below correctly.

Start time	End time	Duration
8: 30p.m	_____	2 hours
_____	11:15a.m	1 hour 10 minutes
12:40p.m	3:15p.m	_____
12:00noon	_____	1 hour 30 minutes
7:55p.m	9:30p.m	_____
_____	1:40a.m	$2\frac{1}{4}$ hours
9:28p.m	5:39a.m	_____
10:43a.m	_____	$4\frac{5}{6}$ hours

9. A netball match started at 12:45p.m and ended at 1:05p.m. How long did it last?
10. A party started at 11:30a.m and ended at 7:45 p.m. How many minutes did the party take?
11. We watched a documentary that started at 7:32p.m and ended at 9:28 p.m. How long was the documentary?
12. Bisaka started digging at 5:58a.m and finished at 11:59a.m. What time did he take digging?
13. A man left town D at 08 32 hours. He reached town E at 14 22 hours, How long was the journey?
14. A train left station A at 19 45hrs and reached station B at 20 38hrs. How long was the journey?
15. Moses took $4\frac{1}{4}$ hours to travel from Kampala to Bukomansimbi. He left Kampala at 11:50a.m. 2 hours 45 minutes later, he reached Lukaya where he stay for some time. He then drove for 35 minutes to Masaka and immediately drove to Bukomansimbi in 42 minutes. For how long did Moses stay in Lukaya?

TOPIC 11: TIME

Time tables

Example 1

The table below shows the departure and arrival time for a bus from Masaka to Mukono via Kampala.

Town	Arrival time	Departure time
Masaka	_____	10:25a.m
Lukaya	11:00a.m	11:05a.m
Mpigi	12:35a.m	12:45p.m
Kampala	1:35.m	2:00p.m
Kireka	2:39p.m	2:45p.m
Mukono	3:05p.m	_____

a) How long did the bus take to travel from Mpigi to Kampala?

1 : 35	12 : 45	13 : 35
+ 12 : 00	+ 00 : 00	- 12 : 45
13 35hrs	12 45hrs	0 : 50

The bus took 50 minutes.

b) What is the total time taken from Kampala to Mukono?

```
  3 : 05
- 2 : 00
  1 : 05
```

The bus took 1 hour 5 minutes.

c) Calculate the total resting time.

Lukaya	Mpigi	Kampala	Kireka
11 : 05	12 : 45	2 : 00	2 : 45
- 11 : 00	- 12 : 35	- 1 : 35	- 2 : 39
0 05	0 10	0 25	0 06
5 minutes	10 minutes	25 minutes	6 minutes

5 + 10 + 25 + 6 = 46 minutes

d) At what time did the bus leave Mpigi?
At 12:45p.m

e) Write the departure time from Kireka in 24 hour clock system.

```
  2  45
+12  00
 14  45 hours
```

f) Express in 24 hour clock system, the arrival time of the bus in Mpigi.

```
 12  35
+ 00  00
 12  35 hours
```

Example 2

A taxi left Masaka at 1055 hours for Lwaggulwe. The table below shows the departure and arrival time of the taxi for different towns.

Towns	Time
Masaka to Kyabakuza	From 1055 hours to 1110 hours
Kyabakuza to Bukoto	From 1115 hours to 1140 hours
Bukoto to Kanoni	From 1148 hours to 1200 hours
Kanoni to Lwaggulwe	From 1200 hours to 1213 hours

a) Change the arrival time of the taxi at Kyabakuza in 12 hour clock.

$$\begin{array}{rr} 11 & 10 \\ -\ 00 & 00 \\ \hline 11 & : 10\text{a.m} \end{array}$$

b) For how long did the taxi stay at Bukoto.

$$\begin{array}{rr} 11 & 48 \\ 11 & 40 \\ \hline 0 & 08 \end{array}$$

It took 8 minutes at Bukoto.

b) How long did the taxi travel from Bukoto to Kanoni?

$$\begin{array}{rr} 12 & 00 \\ -\ 11 & 48 \\ \hline 0 & 12 \end{array}$$

The taxi took 12 minutes

d) How long was the journey?

$$\begin{array}{rr} 12 & 13 \\ -10 & 55 \\ \hline 1 & 18 \end{array}$$

1 hour 18 minutes

Exercise

1. The table below shows how a motor cyclist travelled from town A through towns B and C to town D.

Town	Arrival	Departure
A		10:00a.m
B	10:30a.m	10:45a.m
C	11:15a.m	11:30a.m
D	1:15p.m	

a) How long did the motor cyclist stay at town C?
b) Find the time the motorcyclist took to travel from town C to town D.
c) Change the arrival time at town B in 24 hour clock system.

2. Kiza rode his bicycle from Kyotera to Kalisizo through Buyambi, Kigenya and Nsambya.

Town	Arrival	Departure
Kyotera	_____	8:40a.m
Buyambi	8:48a.m	8:50a.m
Kigenya	8:55a.m	9:30a.m
Nsambya	9:35a.m	9:37a.m
Kalisizo	9:45a.m	_____

a) At what time did Kiza leave Buyambi?
b) Express the arrival time at Nsambya in 24 hour clock system.
c) How long did Kiza take to travel from Kyotera to Kigenya?
d) What is the total time spent at all stoppages?
e) How long was his journey?

3. The table shows the arrival and departure time for the cyclist from Bbotera to Masaka.

Town	Arrival	Departure
Bbotera		5:45p.m
Kabonera	5:55p.m	6:00p.m
Bisanje	6:25p.m	6:30p.m
Kirimya	6:40p.m	7:20p.m
Masaka	7:35p.m	_____

a) Find the total resting time for the whole journey.
b) How long did the cyclist take to travel from Kabonera to Kirimya?
c) In which town did the cyclist spend the most time?
d) Find the total time while travelling.

4. The time table shows how Kagame spent his time on Saturday. Use it to answer the questions that follow.

Time	Activity
6:00a.m - 9:30a.m	Digging
9:45a.m - 12:35p.m	Washing
12:50p.m - 2:30p.m	Playing
4:00p.m - 5:30p.m	Reading

a) How long did Kagame take washing?
b) How many hours did he spend reading?
c) For how many minutes did he play?
d) Write in 24 hour clock, the time he started playing.
e) If he dug his maize garden at a rate of 2 rows for every 15 minutes, find the number of rows he dug that day.

5) A bus left Tororo for Lira via Mbale and Soroti. The table below shows the arrival and departure times of the bus in the named towns.

Town	Arrival	Departure
Tororo		10:45a.m
Mbale	11:45a.m	11:50a.m
Soroti	1:30p.m	1:45a.m
Lira	3:45p.m	

a) At what time did the bus leave Soroti?
b) Express the arrival time at Mbale in 24 hour clock system.
c) For how long did the bus stay at Mbale?
d) How long was the journey?
e) Find the total resting time.

6. The time table below shows the departure and arrival time of the taxi that travels from Itera to Kyezimbire.

Town	Departure time	Arrival time
Itera	11:40 a.m	_____
Rukuraijo	12:00 noon	11:55 a.m
Katera	12:10 p.m	12:02 p.m
Nyabishenge	12:20 p.m	12:15 p.m
Kyezimbire	_____	1:10 p.m

a) At what time of the day did the taxi leave Katera?
b) Find the resting time at Nyabishenge.
c) How long did it take the taxi to travel from Katera to Kyezimbire?
d) Find the total resting time at all stoppages.
e) Find the total time the taxi spent while travelling.

7. The time table below shows the arrival and departure time of the bus that travels from Kisweka to Labongo. Use it to answer questions that follow.

Town	Arrival time	Departure time
Kisweka	_____	22 30HRS
Hoima	00 15HRS	00 30HRS
Masindi	01 30HRS	01 40HRS
Lira	04 50HRS	05 00HRS
Labongo	07 45HRS	_____

a) How long did the bus take to travel to Lira from Kisweka?
b) How long does the bus take resting at Masindi?
c) At what time did the bus depart from Hoima in 12 hour clock system?
d) Find the total resting time of the bus.

8. Masika left Kampala for Iganga driving her car that consumed an average of 5 litres of petrol per hour. The table below shows her arrival and departure time in different towns.

Town	Arrival time	Departure time
Kampala		09 25 hours
Mukono	10 30 hours	10 38 hours
Namagunga	11 12 hours	11 22 hours
Jinja	12 20 hours	12 25 hours
Iganga	13 15 hours	

a) At what 12 hour clock time did she start her journey?
b) How long did she take to travel from Kampala to Mukono?
c) How many litres of petrol did her car consume from Namagunga to Iganga?

9. Study the examination time table below carefully and use it to answer questions that follow.

Date	Morning	Afternoon
7th Nov.	9:00 a.m – 11:00 a.m Briefing	_____
8th Nov.	9:00 a.m – 11:30 a.m Mathematics	2:00 p.m – 4:15 p.m Social studies & R.E
9th Nov.	9:00 a.m – 11:15 a.m Science	2:00 p.m – 4:15 p.m English

a) How long will teachers take while briefing candidates?
b) For how long will candidates rest before writing in for the afternoon paper on 8th November?
c) How long will the mathematics exam take?
d) At what time will the science exam end on a 24 hour clock?

10. The table below shows the time taken by a bus to travel from Masaka via Mbarara and Kasese to Fort portal. Use it to answer questions that follow.

Towns	Travelling time	Resting time
Masaka to Mbarara	2 hours 55 minutes	15 minutes
Mbarara to Kasese	2 hours 26 minutes	10 minutes
Kasese to Fort portal	1 hour 11 minutes	

Given that the bus left Kampala at 11:20 a.m.

a) At what time did the bus reach
   i) Mbarara
   ii) Kasese
b) How long did it take the bus to cover the whole journey?
c) At what time did the bus depart from Mbarara?
d) Write the arrival time of the bus in Fort portal in 24 hour clock system.

11. A motor cyclist left Gulu for Adjuman. The table below shows the time she spent on the way.

Towns	Time while travelling	Resting time
Gulu to Lamogi	25 minutes	5 minutes
Lamogi to Pabo	45 minutes	8 minutes
Pabo to Adjumani	1 hour 15 minutes	_____

Note: *Arrival time at Adjumani was 13 20 hours*

a) How long was the journey?
b) At what time did she depart from Pabo?
c) Write in 24 hour clock system, the time she arrived at
   i) Adjumani
   ii) Lamogi

12. The table shows the litres of petrol a boat consumed from Island P to Island S via Island Q and R. The boat left Isand P at 11:25 p.m.

Island	Litres of petrol	Resting time
P to Q	8 litres	10 minutes
Q to R	5 litres	5 minutes
R to S	3 litres	_____

Given that the boat consumed 4 litres of petrol for every 1 hour.

a) How many hours did the boat take to sail from Island Q to Island R?
b) At what time did the boat leave Island Q?
c) At what time did the boat reach Island S on a 24 hour clock?

13. The time table below shows the journey of a helicopter from village A to village F through B, C, D and E. Study the table and use it to answer the questions that follow.

Village	Arrival	Departure
A		09 00 hrs
B	09 30 hrs	09 45 hrs
C	10 25 hrs	10 30 hrs
D	11 50 hrs	12 00 hrs
E	13 30 hrs	13 40 hrs
F	14 30 hrs	

a) Convert the arrival time of the bus at B into 12 hour clock.
b) How long did the helicopter take to travel from E to F?
c) Find the total resting time of the helicopter at C and D.
d) How long did the helicopter take cover its journey?

14. The table below shows radio programmes one morning.

Time	Programme
7:00 a.m	Music show
7:55 a.m	Weather report
8:00 a.m	News
8:15 a.m	Travel news
8:25 a.m	Sports
8:45 a.m	Holiday pragramme

a) Jacob turns the radio on at 7:25 a.m. How many minutes does he have to wait for the weather report?
b) The holiday program lasts for 45 minutes. At what time does the programme end?

15. Here is part of train time table for six trains from Katwe to Entebbe.

Train	A	B	C	D
Katwe	06 35 hours	07 00 hours	07 15 hours	07 30 hours
Entebbe	08 09 hours	08 39 hours	08 48 hours	09 45 hours

a) Which train takes more than 2 hours to go from Katwe to Entebbe?
b) Work out the number of minutes taken by train A to go from Katwe to Entebbe.
c) Mikie has to go to a meeting in Entebbe. He will catch one of the four trains from Katwe. He needs to arrive in Entebbe before 09 00HRS. Write the latest train that he can catch.
d) Convert the departure time of train C from Katwe in 12 hour clock system.

16. These are opening times of Murungi Doctor's clinic.

Monday	Closed
Tuesday to Friday	11:00 a.m to 6:30 p.m
Saturday	10:00 a.m to 6:00 p.m
Sunday	10:30 a.m to 4:30 p.m

a) For how many hours is the clinic open on Saturday's?
b) Joan arrived at the clinic at 4:56 p.m on Thursday. How long could she stay before the closing time?

c) Convert the closing time on Sundays in 24 hour clock.
d) Last Wednesday, 5 patients visited the doctor in every 30 minutes. Find the total number of patients who visited the doctor that day.

17. The table below shows five journey's a taxi driver made one day and the amount of money he collected per journey.

Journey Number	Starting time	Number of passengers	Distance	Amount of Money
1	9:15 a.m	2	8km	Sh 6,000
2	9:40 a.m	1	12km	Sh 5,000
3	10:30 a.m	3	7km	Sh 7,500
4	10:50 a.m	1	21km	Sh 12,000
5	12:10 p.m	4	15km	Sh 20,000

a) On journey number 5, how much money did each passenger pay?
b) How many passengers made the journey of more than 10km.
c) The 12km journey took 40 minutes. What time did the taxi finish this journey?
d) How long was the fourth journey?

18. The time table below describes Kalule's journey from Kampala to Hoima.

Town	Arrival time	Departure time	Fare
Kampala	_____	7:30 a.m	_____
Busunju	8:15 a.m	8:30 am	Sh. 5,000/=
Bukomero	9:40 a.m	9:55 a.m	Sh. 4,000/=
Kiboga	10:40 a.m	11:15 a.m	Sh. 4,500/=
Hoima	12:15 p.m	_____	Sh. 7,500/=

a) At what time did he leave Busunju?
b) For how long did he stay at Kiboga?
c) How much money did he pay for the whole journey?
e) How much longer did he rest at Kiboga than at Bukomero?

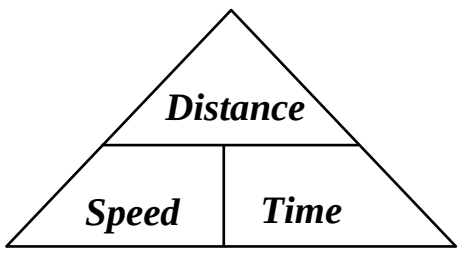
Finding distance covered (Distance = Speed × Time)

To find distance covered, we multiply speed by time.

Example 1

A bus moved at speed of 75 kilometres per hour for 4 hours.
Find the distance it covered.

Distance = Speed × Time
= 75km/h × 4hrs
= $\frac{75km}{1h}$ × 4hrs
= 300km



Example 2

A car travelled for $2\frac{1}{4}$ hours at an average speed of 60km/h.

Distance = Speed × Time

$= 60\text{km/h} \times 2\frac{1}{4}\text{h}$

$= \frac{60\text{km}}{1\text{h}} \times \frac{9}{4}\text{h}$

$= 15\text{km} \times 9$

$= 135\text{km}$

Example 3

A motor cyclist covered a distance in 20 minutes at an average speed of 105km/h. Find the distance covered.

Distance = Speed x Time

Distance = $105\text{km/h} \times (\frac{20}{60})\text{h}$

Distance = $\frac{105\text{km}}{1\text{h}} \times (\frac{1}{3})\text{h}$

Distance = 35km

Example 4

Find the distance covered in 75 seconds at a speed of 12m/sec.

Distance = Speed × Time

$= 12\text{m/s} \times 75\text{s}$

$= \frac{12\text{m}}{1\text{s}} \times 75\text{s}$

$= 900\text{m}$

Example 5

During a running race, Solomon covered 5 metres for every 2 seconds. How far did he go in 40 seconds?

Distance = Speed × Time

$= \frac{5\text{m}}{2\text{s}} \times 40\text{s}$

Distance = $5\text{m} \times 20$

Distance = 100 metres

Exercise

1. Find the distance covered by a car moving at a;
   - i) speed of 50km/h for 2 hours.
   - ii) speed of 35km/h for 5 hours.
   - iii) speed of 75 kilometres per hour for 6 hours.
   - iv) speed of 65km/h for 4 hours.
   - v) Speed of 80km/h for $1\frac{1}{2}$ hours.
   - vi) Speed of 100km/h for $2\frac{1}{2}$ hours.
   - vii) Speed of 60km/h for $3\frac{1}{4}$ hours.
   - viii) Speed of 80km/h for 40 minutes.
   - ix) Speed of 90km/h for 30 minutes.
   - x) Speed of 80km/h for 45 minutes.
2. Asia's journey took $3\frac{1}{2}$ hours at an average speed of 75 kilometres per hour. How far did she go?
3. The speed of a car is 108km/h. How far will it go in 2 hours 30 minutes?
4. A cyclist rode for 1 hour 30 minutes at an average speed of 15km/h. Find the distance covered.

5. A taxi covered a certain distance at a speed of 70km/h in 30 minutes. Calculate the distance the taxi covered.
6. Aine travelled for $4\frac{1}{4}$ hours at a speed of 80km per hour. What distance did she cover?
7. A car moved at a speed of 63km per hour for $3\frac{1}{3}$ hours. Find the distance it covered.
8. Apio travelled for 4 hours at a speed of 36.5km/h. What distance did he cover?
9. A train moved at a speed of 88km/h for 5 hours 30minutes. Calculate the distance it covered.
10. At a speed of 24 kilometres per hour, Mukiibi takes 45 minutes to cover his journey. Find the distance covered.
11. A biker cycles at 40kph for 12 minutes. What distance does he cover?
12. Calculate the distance travelled in 8 seconds at 9m/s.
13. Amooti runs at a speed of 18m/s. What distance does he cover in 15 seconds?
14. What distance will be covered at a speed of 20m/s for 5 minutes.
15. A horse moves at a speed of 18m/s. What distance does she cover in 15 minutes.
16. A car moving at 20m/s covered a distance in 25 minutes 15 seconds. Find the distance it covered in
    i) Metres
    ii) Kilometres

More problems involving finding distance covered

Example 1

A taxi which travels at 60km/h leaves Kawoko at 10:30 a.m and arrives at Kampala at 1:15 p.m. What is the distance between Kampala and Kawoko?

Hours	Minutes
12	00
- 10	30
1	30

Hours	Minutes
1	30
+ 1	15
2	45

2 hours 45 minutes

45 minutes $= \frac{45}{60}$

$= \frac{3}{4}$hrs

Time $= 2\frac{3}{4}$hrs

Distance between Kampala and Kawoko

Distance = Speed × Time

Distance = $60\text{km/h} \times 2\frac{3}{4}\text{h}$

Distance = $\frac{60\text{km}}{1\text{h}} \times \frac{11}{4}\text{h}$

Distance = $15\text{km} \times 11$

Distance = 165km

The distance between Kampala and Kawoko is 165km.

Example 2

Joan drove from town P to town Q at a speed of 60km/h in 2 hours. If it took her $1\frac{1}{2}$ hours to drive from Q to the next town R at the same speed, how far is town R from town P?

Distance between P and Q

D = S × T

D = $\frac{60km}{1h}$ × 2hrs

D = 120km

Distance between Q and R

D = 60km/h × $1\frac{1}{2}$h

D = $\frac{60km}{1h}$ × $\frac{3}{2}$h

D = 30km × 3

D = 90km

Distance between P and R

120km + 90km = 210km.

The distance between P and Q is 210km

Exercise

1. Find the distance covered by a bus moving at a;
   i) speed of 80km/h from 9:15 a.m to 11:15 a.m.
   ii) speed of 48km/h from 10:30 a.m to 1:00 p.m.
   iii) speed of 120km/h from 10:30 a.m to 1:20 p.m.
   iv) speed of 60km/h from 10:20 p.m to 2:30 a.m.
   v) speed of 80km/h from 8:30 p.m to 1:30 a.m.
2. From 8:30p.m to 1:30 a.m. Amos covered a certain distance at a speed of 80km/h. Calculate the distance he covered.
3. The journey made by a truck from Lira to Gulu was started at 7:20p.m and ended at 3:30a.m moving at an average speed of 30km/h. Find the distance in kilometres between Gulu and Lira
4. Moving at 60km/h, a train completed the journey from 9:30 a.m to 12:20 p.m. How long was the journey?
5. A Cyclist left town M at 10:15 a.m and arrived to town N at 1:30 p.m moving at a speed of 80km/h. Calculate the distance between town M and town N.
6. Edward drove from town A for 3 hours to town B at an average speed of 50km/h. He immediately continued to town C at a speed of 60km/h in 2 hours.
   Calculate the distance between
   a) town A and town B.
   b) town A and town C.
7. A motorist covered a distance at a speed of 40km/h in 5 hours. She covered another distance in $2\frac{1}{2}$ hours at a speed of 60km/hr. Calculate the total distance covered.
8. A motorist left Jinja at 9:30 a.m and arrived Kampala at 11:00a.m moving at 36 kilometres per hour. He immediately travelled to Masaka moving at an average speed of 60km/h for 2 hours.
   a) At what time did he reach Masaka?
   b) How far is Masaka from Jinja?

9. A bus left Arua for Kampala at 7:15 a.m. It was moving at an average speed of 96km/h for $3\frac{1}{4}$ hours. It then changed its speed to 100km/h for 3 hours to Kampala.
   a) How far is Kampala from Arua?
   b) At what time did the bus reach Kampala?
10. A driver covered the first part of his journey at an average speed of 35km/h in 4 hours. He then covered the second part of his journey in 3 hours at 40km/h reaching his destination at 2:20 p.m.
   a) Find in kilometres, the distance covered.
   b) At what time did the driver start his journey?
11. A motorist drove his car from 10:45 a.m at an average speed of 36km/h to 1:00 p.m.
   a) Calculate the distance he covered.
   b) If his car consumes 6 litres of diesel for every 18km and each litre costs sh. 6200. How much will the whole journey cost him?
12. A taxi driver left village A for village B at 10:30 a.m driving at a speed of 80 kilometres per hour. The driver reached village B at 2:00 p.m.
   a) Calculate the time taken by the driver to reach village B.
   b) Find the distance between village A and village B.
13. A bus that left town P at 11:30a.m at a speed of 60km/h reached town Q at 1:30p.m. The bus stayed at town Q for 40 minutes. It then continued to town R at a speed of 64km/h for 1 hour 30 minutes.
   a) Calculate the total distance covered by the bus town P to town R.
   b) At what time did the bus reach town R?
14. An aeroplane flying at an average speed of 180km/h from airport K to airport L took 30 minutes. It rested at airport L for $1\frac{1}{4}$ hours and proceeded to airport M at a speed of 260km/h for 45minutes where it reached at 1:15 p.m.
   a) At what time did the aeroplane leave airport K?
   b) How far is airport M from airport K.
15. The time table below shows the journey a bus from Kampala to Mbale through Jinja, Iganga, Bugiri and Tororo. Study the table and use it to answer the questions that follow.

Town	Arrival time	Departure time
Kampala		08 00hrs
Jinja	08 30hrs	08 45hrs
Iganga	09 25hrs	09 30hrs
Bugiri	10 50hrs	11 00hrs
Tororo	12 30hrs	12 40hrs
Mbale	13 30hrs	_____

   a) Convert the arrival time of the bus at Tororo into 12 hour clock.
   b) How long did the bus take to travel from Tororo to Mbale?
   c) The average speed of the bus for the whole journey was 50 kilometres per hour. Find the distance from Kampala to Mbale.

16. The time table below is for a bus travelling from Town A to Town B
Use it to answer questions that follows.

A	Departure	9:00 a.m
B	Arrival Departure	9:45 a.m 10:00 a.m
C	Arrival Departure	11:15 a.m 11:30 a.m
D	Arrival Departure	12:00 noon 12:20 p.m
E	Arrival	1:30 p.m

a) Find the total time the bus takes stopping on the way.
b) How long does the bus take to travel from town A to town E?
c) The average speed of the journey is 56 kilometres per hour. Find the distance from town A to town E.

Finding time taken (Time = Distance ÷ Speed)

Example 1

How long will a train take to cover a distance of 96 kilometres at an average speed of 64 kilometres per hour?

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

$$\text{Time} = 96\text{km} \div \frac{64\text{km}}{1\text{h}}$$

$$\text{Time} = 96\text{km} \times \frac{1\text{h}}{64\text{km}}$$

$$\text{Time} = 1\frac{1}{2}\text{hours}$$

Example 2

If a bus moves at 72km/h and covers 54 kilometres, how many minutes does it take to cover the distance?

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

$$\text{Time} = 54\text{km} \div \frac{72\text{km}}{1\text{h}}$$

$$\text{Time} = 54\text{km} \times \frac{1\text{h}}{72\text{km}}$$

$$\text{Time} = \frac{3}{4}\text{ hours}$$

$\frac{3}{4} \times 60$ minutes $= 45$ minutes

It takes 45 minutes.

Example 3

Town P is 144km away from town Q. A motorist left town Q at 11:20 a.m driving at an average speed of 48km/h. At what time did he reach town P?

Time taken

$T = D \div S$

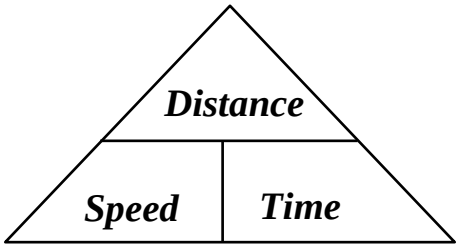
$$T = 144\text{km} \div \frac{48\text{km}}{1\text{h}}$$

$$T = 144\text{km} \times \frac{1\text{h}}{48\text{km}}$$

$T = 3$ hours

Arrival time at P

Hours	Minutes
11	20
+ 3	00
14	20
- 12	00
2 :	20 p.m



Exercise

1. How long will a car take to cover
   i) a distance of 80km at a speed of 20km/h?
   ii) a distance of 56km at a speed of 28km/h?
   iii) a distance of 90km at a speed of 60km/h?
   iv) a distance of 100km at a speed of 50km/h?
   v) a distance of 120km at a speed of 80km/h?

2. How many hours will a motorbike take to cover a distance of 108km at a speed of 36km/h?

3. At a speed of 64km/h, a car covers a distance of 192 kilometres per hour. How long is the journey?

4. Kyotera is 15 kilometres away from Katindo. Mzee Minani rode his bicycle at an average speed of 10km/h from Katindo to Kyotera. How long was the journey?

5. The speed of an athlete is 12 kilometres per hour. How long will he take to cover a distance of 30 kilometres?

6. A lorry driver travelled at 84km/h and covered a distance of 525 kilometres. How long did he take to cover the distance?

7. A cyclist left his home at 7:15 a.m. He travelled at an average speed of 20km/h to the city which is 80km away.
   a) How long was the journey?
   b) Find the time at which he reached the city.

8. A train covered a distance of 140km from station A to station B at an average speed of 40km/h. It ended its journey at 9:45 p.m.
   a) How long was the journey?
   b) At what time did it leave station A?

9. An aeroplane left airport M at 10:23 a.m flying for airport N which is 195km away at a steady speed of 260km/h. At what time did it land at airport N?

10. Moving at speed of 14km/h, Alex covered a 70 kilometres reaching his home at 2:45 p.m.
    a) How long was the journey?
    b) At what time did he start the journey?

11. The diagram below shows the distance between four towns; W, X, Y and Z. Study it carefully and answer questions that follow.
    a) How far is town W from town Z?
    b) A car left town W at 9:45 a.m moving at an average speed of 78km per hour to town Y. At what time did it reach town Y?

12. The table below shows the distance between towns A and towns B, C, D and E along the high way.

Town	Distance in km
B	40
C	63
D	75
E	120

a) How far is town D from town B?
b) Find in minutes, the time taken to travel from town A to town B at a speed of 100km/h.
c) A motor cyclist left town C at 11:55 a.m moving at a speed of 38 kilometres per hour. At what time did he reach town E?

13. The table below shows the distance and transport fare of the bus from Kampala to Yumbe via Pakwachi, Arua and Koboko.

Town	Distance	Transport fare
Pakwachi	369km	shs. 40,000
Arua	496km	shs. 45,000
Koboko	550km	shs. 52,000
Yumbe	655km	shs. 55,000

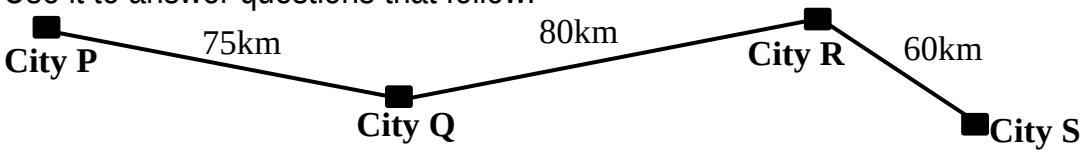
a) How far is Koboko from Pakwachi?
b) If the bus leaves Kampala at 7:48 p.m moving at an average speed of 110km/h,at what time will it reach Koboko?
c) How long will the bus take to travel from Arua to Yumbe at an average speed of 53 kilometres per hour?
d) A bus from Kampala travelling at an average speed of 65.5 km/h reaches Yumbe at 7:12 p.m. At what time does it depart from Kampala?
e) A bus left Kampala with 60 passengers. At Pakwachi, 12 got out, At Arua, 10 got out. At Koboko, 15 got out and at Yumbe all the remaining passengers got out. How much money was collected from all the passengers that day?

14. A taxi left Jinja for Museru moving at an average speed of 90km/h. The table below shows the distance between towns through which the taxi passed.

Jinja			
40km	Njereka		
75km	35km	Kamuli	
175km	135km	100km	Museru

a) How far is Jinja from Kamuli?
b) Which two towns have the shortest distance apart?
c) At 11:30 a.m, the taxi left Njereka and moved directly to Museru without stopping. At what time did it reach Museru?

15. The drawing below shows the distance between cities along the same high–way. Use it to answer questions that follow.



a) How far is city P from City R?
b) How many minutes will a motorcyclist take to travel from city R to city S at an average speed of 90kph?
c) A driver left city S driving at 56 kilometres per hour and reached city Q at 1:15 p.m. At what time did she depart from town S?

16. How long will Magur take to finish a 100 metre race at a speed of 12.5 metres per second?

More problems involving finding time taken

Example 1

A car covered a distance in 4 hours at 60km/h. How long would it take to cover the same distance at 80km/h?

Distance

$D = S \times T$

$D = \frac{60km}{1h} \times 4h$

$D = 60km \times 4$

$D = 20km$

Time taken

Time = Distance ÷ Speed

$Time = 240km \div \frac{80km}{1h}$

$Time = 240km \times \frac{1h}{80km}$

Time = 3 hours

Example 2

Kituyi left Mbale at 8:30 a.m for Kampala driving at a speed of 80km/h and reached Kampala at 1:00 p.m. She rested for 1 hour at Kampala and then drove back to Mbale at an average speed of 72km/h. At what time did she reach Mbale?

Hours	Minutes
12	00
- 8	30
3	30
+ 1	00
4	30

4 hours 30 minutes

30 minutes = $(\frac{30}{60})$ hours

= $\frac{1}{2}$ hours

Time = $4\frac{1}{2}$ hours

Distance from Mbale to Kampala

Distance = Speed × Time

$Distance = \frac{80km}{1h} \times 4\frac{1}{2}h$

$Distance = 80km \times \frac{9}{2}$

= 360km

Time = Distance ÷ Speed

$Time = 360km \div \frac{72km}{1hr}$

$Time = 360km \times \frac{1h}{72km}$

Time = 5 hours

Departure time

1 : 00 pm

+1 : 00

2 : 00 p.m

Arrival time

2 : 00 p.m

+ 5 : 00

7 : 00 p.m

Example 3

A car covers a distance of 160km at an average speed of 80km/h. How much longer does it take if it moves at 20km/h?

$$\text{Time taken} = \frac{\text{Distance}}{\text{speed}}$$

$$\text{Time taken} = 160\text{km} \div \frac{80\text{km}}{1\text{hr}}$$

$$= 160\text{km} \times \frac{1\text{h}}{80\text{km}}$$

$$= 2 \text{ hours}$$

$$\text{Time taken} = \text{Distance} \div \text{Speed}$$

$$= 160\text{km} \times \frac{20\text{km}}{1\text{h}}$$

$$= 160\text{km} \times \frac{1\text{h}}{20\text{km}}$$

$$= 8 \text{ hours}$$

8 hours – 2 hours = 6 hours

The car takes 6 hours longer.

Exercise

1. At 20km/h, a cyclist covers 160km.
   a) How long does he take to cover that distance?
   b) If he changes the speed to 16km/h, how much longer will he take to cover the distance?
2. Town C is 240km from town D. A taxi and bus left town C for town D at an average speed of 40km/h and 60km/h respectively.
   a) How long did the bus take?
   b) How much longer did the taxi take than the bus?
3. A distance of 720km can be covered at a speed of 90km/h. How much longer will the same distance be covered at 60km/h?
4. Station A and station B are 360km a part. A train covers that distance at a speed of 45 kilometres per hour.
   a) How long does the train take to move from station A to station B?
   b) How many hours less will the train take if its speed is increased to 60km/h?
5. At 30 kilometres per hour, a car can cover a distance of 630 kilometres.
   How many hours less will it take to cover the same distance at a speed of 105km/h?
6. A motor cyclist covered a distance in 3 hours at 80km/h.
   a) Find in kilometres, the distance he covered.
   b) How long would he take to cover the same distance at 48km/h?
7. A boy riding a bicycle covered a distance from Meru to Kyansi in $1\frac{1}{2}$ hours at a speed of 8km/h.
   a) How far is Meru from Kyansi?
   b) How long would he take if he moved at a speed of 4km/h?
8. In 4 hours, a bus covered a distance at 100km/h. How long would it take to cover the same distance at 80km/h?
9. A bus moving at a speed of 80km per hour leaves Jinja at 8:00 a.m for Busia and arrives there at 11:00 a.m.
   a) How far is Busia from Jinja?
   b) How many hours will it take to travel back to Jinja at 96km per hour?

10. A motorcyclist leaves his home at 9:30 a.m for Buyamba which is 75km away riding at 20km/h for $1\frac{1}{2}$ hours. He then changed the speed and covered the remaining part of the journey at 15km/h.
    a) How long did he take to cover the second part of the journey?
    b) At what time did he reach Buyamba?
11. Zaake drove at 60km per hour for $2\frac{1}{2}$ hours from town X to Y. He immediately drove back to town X at a speed of 75km/h where he reached at 1:25 p.m.
    a) At what time did he start his journey from town X?
    b) If the cost of petrol was sh. 5400 per litre and Zaake's car used one litre to cover 10 kilometres, find the cost of petrol for the journey.
12. A motorist covered 120km from 9:20 a.m to 11:20 a.m. He rested for 30 minutes and continued to his destination at 50km/h. The total distance he covered was 390km.
    a) Find the total time he took to cover the two journeys.
    b) At what time did he reach his destination?
13. Town M is 150km from town G. A motorcyclist started a journey from town M at 10:30 a.m. He was travelling at a speed of 25km/h for 2 hours. He rested for 30 minutes and then continued at a speed of 50km/h for the rest of the journey to town G. At what time did the motorcyclist reach town G?
14. Mutaaya rode a bicycle from town A to town C which is 80km away. He rode from A to B for 3 hours at a speed of 10km and then rested for $\frac{1}{2}$ an hour. From B, he rode to C at a speed of 20km/h.
15. A taxi driver left town A for town B at 10:30 a.m driving at a speed of 80 kilometres per hour. The driver reached town B at 2:00 p.m. He rested for 20 minutes and drove back to town A at 70km/h.
    a) Find the distance between town A and town B.
    b) At what time did the driver reach town A?
16. A bus driver covered distance from city C to city D in $3\frac{1}{4}$ hours at a speed of 80 kilometres per hour. He rested for 35 minutes at D and then drove back to C through the same route at an average speed of 65km/h reaching at 8:15 p.m. At what time did the bus driver leave town D?
17. A train that left station P at 11: 38 a.m moving at a speed of 60km/h reached station Q at 1:38 p.m. The train stayed at station Q for 40 minutes. It then continued to station R and covered a distance of 96 kilometres at a speed of 64km/h.
    a) Calculate the total distance covered by the train from station P to station R.
    b) At what time did the train reach station R?

TOPIC 11: TIME

Finding speeding

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

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

Example 1

A bus travelled for 2 hours and covered a distance of 140km. At what speed was it travelling?

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

$$\text{Speed} = \frac{140\text{km}}{2\text{h}}$$

$$\text{Speed} = 70\text{km/h}$$

Example 3

A bullet covered 380 metres in 5 seconds. Find the speed of the bullet in m/s.

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

$$\text{Speed} = \frac{380\text{m}}{5\text{s}}$$

$$\text{Speed} = 76\text{m/s}$$

Example 2

A taxi covered a distance of 60 kilometres from 1:40 p.m to 4:10p.m. At what speed was it travelling?

Time taken

Hours	Minutes
4	10
- 1	40
2	30

2 hours 30 minutes

$30 \text{ minutes} = (\frac{30}{60})\text{h}$

$= \frac{1}{2}\text{h}$

Time taken $= 2\frac{1}{2}$ hours

Speed in km/h

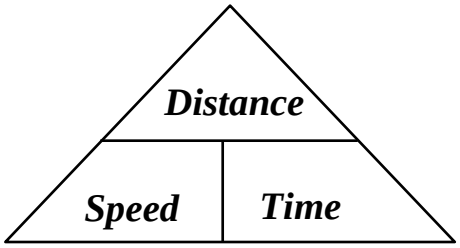
Speed = Distance ÷ Time

Speed $= 60\text{km} \div 2\frac{1}{2}\text{h}$

Speed $= 60\text{km} \div \frac{5}{2}\text{h}$

Speed $= 60\text{km} \times \frac{2}{5\text{h}}$

Speed = 24km/h



Exercise

1. Find the speed of a car which travelled for;
   i) 5 hours to cover a distance of 100km.
   ii) 2 hours to cover a distance of 130km.
   iii) 7 hours to cover a distance of 350km.
   iv) $\frac{1}{2}$ hour to cover a distance of 40km.
   v) $2\frac{1}{2}$hours to cover a distance of 150km.

2. Find the speed of a bus which travelled for;
   i) 20 minutes to cover a distance of 28km.
   ii) 40 minutes to cover a distance of 36km
   iii) 36 minutes to cover a distance of 45km.
3. Pilgrimages walked 75 kilometres in 25 hours. Find their speed in km/h.
4. Ssenyondo covered 120 kilometres in $1\frac{1}{2}$ hours. What speed was he travelling?
5. A distance of 160 kilometres was covered by a motorcyclist in 5 hours. Find the speed of the motorcyclist in kilometres per hour.
6. An ostrich covered 96 kilometres In $1\frac{1}{2}$ hours. Find its speed in km/h.
7. Jacob covered 6km in 45 minutes. Find his speed in km/h.
8. A taxi took 50 minutes to travel from town X to town Y. The two towns are 60km apart. Find its speed in km/h.
9. It takes 1 hour 30 minutes for a train to travel from station A to station B. Station B is 96km away from station A. Find the speed of the train.
10. Allen left her home at 9:15 a.m for town which is 94km away. She reached town at 11:15 a.m.
    a) How long was the journey.
    b) Calculate her speed in km/h.
11. A train covered a distance of 225 kilometres from 10:20 a.m to 2:50 p.m. Calculate the speed of the train.
12. Airports E and F are 201 kilometres apart. An aeroplane left airport E at 12:50 p.m and reached airport F at 1:35 p.m. Calculate its speed in kilometres per hour.
13. Busia is 195 kilometres away from Kampala. A bus left Kampala at 11:40 p.m and reached Busia at 3:25 a.m.
    a) How long was the journey?
    b) At what speed did the bus travel?
14. The time table below shows the journey of a bus from Mbale to Kampala through Tororo, Bugiri, Iganga and Jinja. Study the table and use it to answer the questions that follow.

Town	Arrival time	Departure time
Mbale	_____	08 00 hours
Tororo	08 30 hours	08 45 hours
Bugiri	09 25 hours	09 30 hours
Iganga	10 50 hours	11 00 hours
Jinja	12 30 hours	12 40 hours
Kampala	13 30 hours	_____

   a) Convert the arrival time of the bus at Bugiri into 24 hour clock.
   b) How long did the bus take to travel from Jinja to Kampala?
   c) The distance from Mbale to Kampala is 275 kilometres. Calculate the average speed of the bus for the whole journey.

15. The table shows how a motor cyclist travelled from town K through towns L and M to town N. Study and use it to answer the questions that follow.

Town	Arrival	Departure
K	_____	9:00 a.m
L	9:30 a.m	9:44 a.m
M	10:35 a.m	11:16 a.m
N	1:30 p.m	_____

a) How long did the motor cyclist stay at town M?
b) Find the time the motor cyclist took to travel from town K to town N.
c) If the distance from town K to town N is 288 kilometres, calculate the average speed of the motorist for the whole journey.

16. The time table below is for a bus from town A to town E. Use it to answer the questions that follow.

A	Departure	9 : 00 a.m
B	Arrival	9 : 46 a.m
	Departure	10 : 00 a.m
C	Arrival	11 : 18 a.m
	Departure	11 : 30 a.m
D	Arrival	12 : 00 a.m
	Departure	12 : 26 a.m
E	Arrival	1 : 30 p.m

a) How long does the bus take to travel from town A to town E?
b) Find the total time the bus takes stopping on the way.
c) If E is 378 kilometres from A. Find the average speed of the bus.

17. The table below shows the distance between towns A, B, C, D and E. Study it carefully and use it to answer questions that follow.

Route	Distance
A to B	35km
B to C	25km
C to D	42km
D to E	66km

a) How far is town D from town B?
b) A bus left town A at 12:15 p.m and reached town E at 3:45 p.m. Calculate the speed of the bus.

18. The table below shows the distance between towns . Use it to answer questions that follow.

Saza			
55km	***Kitovu***		
80km	40km	***Bulayi***	
60km	65km	35km	***Misaali***

a) Which town is 65km away from Kitovu?
b) How far is Misaali from Saza?
c) A man travelled from Kitovu to Bulayi via Misaali. Find in kilometres, the total distance he covered.
d) Namusisi left Misaali for Saza via Bulayi at 10:55 a.m. She reached Saza at 12:10 p.m. Calculate the speed at which she travelled.

19. The table below shows the distance of towns along Mutukula road from Kampala. Study it carefully and use it to answer questions that follow.

Town	Distance
Mpigi	40 km
Masaka	132 km
Kyotera	180 km
Mutukula	224 km

a) How far is Kyotera from Mpigi?
b) Which town is 48km away from Masaka?
c) Amuke took 3 hours 12minutes to travel from Kampala to Mukula. At what speed was she travelling?

20. A car covers 108 metres in 4 seconds. Calculate its speed in m/s.
21. A racing car covered 1260 metres in 13 seconds. Find its speed in m/s.
22. An athlete runs 1500m in 4 minutes 10 seconds. Calculate the average speed of the athlete in m/s.

More problems about finding speed

Remember;
In order to find speed in mathematics, it is necessary to know both the distance travelled and the amount of time taken to cover that distance.
Follow step-by-step method to calculate speed.

You should also master the following:

Distance = Speed x Time

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

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

Example 1

A motor cyclist left home at 8:00 a.m and travelled to town for 3 hours at an average speed of 84km/h. He rested for 30 minutes and then travelled back home. Calculate the speed at which the motor cyclist travelled back if he reached home at 4:10 p.m.

Distance from home to town

Distance = Speed × Time

$\text{Distance} = \frac{84\text{km}}{1\text{h}} \times 3\text{h}$

$= 252\text{km}$

Arrival time to town

8 00
+ 3 00
11 : 00 a.m

Departure time from town

11 00
+ 30
11 : 30 a.m

Time take to travel back

Hours Minutes
12 00
-11 30
0 30
+4 10
4 40

4 hours 30 minutes

30 minutes $= (\frac{40}{60})\text{h}$

$= \frac{2}{3}\text{h}$

Time $= 4\frac{2}{3}\text{h}$

Returning speed

Speed = Distance ÷ Time

Speed $= 252\text{km} \div 4\frac{2}{3}\text{h}$

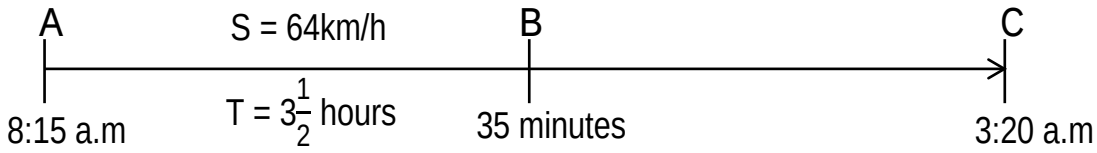
$= 252\text{km} \div \frac{14}{3}\text{h}$

$= 252\text{km} \times \frac{3}{14}\text{h}$

$= 54\text{km/h}$

Example 2

A motorist started his journey for town C via town B from town A at 8:15 a.m. He travelled at a speed of 64km/h for $3\frac{1}{2}$ hours to town B. He rested for 35 minutes then continued to town C where he reached at 3:20 p.m. At what speed did the motorist travel to C from B if C is 404km away from A?



Distance from A to B

Distance = Speed × Time

Distance = $\frac{84km}{1h} \times 3\frac{1}{2}h$

= $84km \times \frac{7}{2}h$

= 224km

Arrival time at B

8 : 15
+ 3 30
11 : 45 a.m

Departure time from B

11: 45
+ 35
12 : 20 pm

Time taken from B to C

Hours	Minutes
3	20
+ 12	00
15	20
- 12	20
3	00

Time = 3 hours

Distance from B to C

404km – 224km = 180km

Speed

Speed = Distance ÷ Time

Speed = 180km ÷ 3h

= $180km \div \frac{3h}{1}$

= $180km \times \frac{1}{3h}$

= 60km/h

Exercise

1. A motorcyclist leaves home at 10:00 a.m for Gomba which is 45km away, riding at 16km per hour. At 10:15 a.m, he gets a puncture and delays for 15 minutes. At what speed must she cover the remaining journey in order to reach Gomba at 11:00 a.m?
2. Town Z is 220km away from town X. A taxi left town X at a speed of 40km per hour for 3 hours to town Y. At what speed must it travel to reach town Z in 2 hours?
3. A pastor left home at 7:45 a.m on his bicycle travelling at a speed of 8km/h. After 45 minutes, his bicycle broke. He spent 15 minutes repairing it. At what speed must he travel in order to reach church at 9:30 a.m if the church is 15km away from his home?

4. A train covered a distance from station X to station Y in $3\frac{1}{2}$ hours at 84km/hr. At 2:00 p.m, the train left station Y travelling back to station X through the same route. If it reached at 5:00 p.m, at what speed did travel?
5. Town M is 200km away from town K. A motor cyclist left town K at 9:30 am. He was travelling at a speed of 25km/h for 2 hours. He rested for 30minutes and then continued to town M. He reached town M at 2:30 p.m. At what speed did he cover the second part of the journey?
6. Complete the table below.

Departure time	Arrival time	Time taken	Distance covered	Speed
8:20 a.m	_____	5 hours	150km	_____
9:20p.m	10:50p.m	____	84km	_____
1:35p.m	_____	____	135km	30km/h
_____	1:20p.m	2 hours 15 minutes	_____	60km/h
_____	2:25p.m	3h 40 minutes	_____	72km/h

7. Job got into a bus at 6:00 a.m. Usually the bus travels at an average speed of 30km/h and reaches the train station at 10:00 a.m. But that day, it was travelling at 20km/h due to traffic jam. At 8:00 a.m, Job got out of the bus and boarded a special car. He reached the station at exactly 10:00 a.m. What was the speed of the car?
8. Jane travels at a speed of 15km/h from Lusese to Ndagwe a distance of 25km. Annet is travelling from Butiti to Ndagwe a distance of 44km. Both people start their journeys at the same time. Annet arrives 2 hours after Jane. What is the speed at which Annet was travelling?
9. Running at a speed of 60 kilometres per hour, a train passed through a 1.5km long tunnel in only 2 minutes. Find in metres, the length of the train.
10. An athlete runs around a circular track on a field of diameter 840 metres. After the first round, she adjusts her shoes for 30 seconds and then covers the second round at 4 m/s. It took her 18 minutes 50 seconds to finish the two rounds. Calculate her speed in m/s during the first round.
11. Chepete walked from his home to the market at an average speed of 5km/h and took 2 hours 24 minutes. He returned home in 3 hours. Calculate in km/h, the speed at which he walked back home.
12. An aeroplane covers a certain distance at a speed of 240km/h in 5 hours. At what speed must it cover the same distance from 11:00 a.m to 12:40 p.m?
13. A sales man travels a distance of 50 kilometres in 2 hours 30 minutes. How much faster in kilometres per hour must he travel to make such trip in 2 hours?
14. A person has to cover a distance of 6km in 45 minutes. If he covers a half of the distance in $\frac{2}{3}$ of the total time, at what speed must he travel to cover the remaining distance?

Expressing kilometres per hour as metres per second

Example 1

Express 108km/h as m/s.

Distance in metres

1km = 1000m

108km = 108 × 1000m

= 108000m

Time in seconds

1 hour = 3600s

Speed in m/s

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

$$= \frac{108000\text{m}}{3600\text{s}}$$

$$= 30\text{m/s}$$

Example 2

A motorcyclist covered 54km from 12:30 p.m to 2:00 p.m. Calculate the speed at which the motorist travelled in metres per second.

Time taken in hours

Hours	Minutes
2	00
+ 12	00
14	00
- 12	30
1	30

1 hour 30 minutes

30 minutes = $(\frac{30}{60})$ hours

$= \frac{1}{2}$ hours

Time = $1\frac{1}{2}$ hours

Time taken in seconds

1 hour = 3600s

$1\frac{1}{2}$ hours = $\frac{3}{2} \times 3600\text{s}$

= 5400s

Distance covered in metres

1km = 1000m

54km = 54 × 1000m

= 54000m

Speed in m/s

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

$$\text{Speed} = \frac{54000\text{m}}{5400\text{s}}$$

$$= 10\text{m/s}$$

Example 3

A bus covered 60km in 40 minutes. Express its speed as m/s

Distance in metres

1km = 1000m

60km = 60 × 1000m

= 60000m

Time in seconds

1 minute = 60 seconds

40 minutes = 40 × 60 seconds

= 2400 seconds

Speed in m/s

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

$$\text{Speed} = \frac{60000\text{m}}{2400\text{s}}$$

$$\text{Speed} = 25\text{m/s}$$

Exercise

1. Change from km/h to m/s.

a) 36km/h	j) 216km/h	s) 684km/h
b) 18km/h	k) 288km/h	t) 468 km/h
c) 54km/h	i) 252 km/h	u) 432km/h
d) 72km/h	m) 396km/h	v) 576km/h
e) 144km/h	h) 324km/h	w) 900kph
f) 90km/h	o) 540km/h	x) 504kph
g) 180km/h	p) 360km/h	y) 522kph
h) 108km/h	q) 720km/h	z) 450kph
i) 162km/h	r) 432km/h	

2. A car covered 144km in 4hours. Express its speed in metres per second.
3. A bus covered a distance of 180km in 2 hours. Calculate its speed in m/s.
4. It takes 7 hours for a taxi to cover 378 kilometres. Calculate its speed in metres per second.
5. An aeroplane covered a distance of 936 kilometres from 9:30 a.m to 11:30 a.m. Calculate its speed in metres per second.
6. It took $1\frac{1}{2}$ hours for a motor cyclist to travel from town P to town Q a distance of 108 kilometres. Find in m/s, the speed at which the motor cyclist travelled.
7. In 2 hours 30 minutes, a lorry covered a distance of 90 kilometres. Calculate its speed in kilometres per hour.
8. It takes 3 hours 40 minutes to cover a distance of 198km. Calculate the speed in m/s.
9. Kitaasa is 144 kilometres away from Katonga. A taxi left Katonga at 8:00 a.m and reached Kitaasa at 12:00 noon. Find the average speed of the taxi in metres per second.
10. A driver covered 225 kilometres from 1:45 p.m to 4:15 p.m. Express his speed in metres per second.
11. The distance from town A to town B is 420 kilometres. A bus left town A at 10:25 p.m and reached town B at 3:05 a.m. Calculate its speed in metres per second.
12. The time table below shows the arrival time, and departure time of a bus and distance between towns P, Q and R. Study it carefully and answer the question that follows.

Town	Arrival	Departure	Distance
P	_____	10:40 a.m	_____
Q	11:40 a.m	11:15a.m	145km
R	2:10 p.m	_____	252km

Find in m/s, the average speed of the bus for the whole journey.

13. An aeroplane covered 324 kilometres in 45 minutes . Calculate its speed in m/s.
14. A driver covered 36 kilometres in only 20 minutes. Calculate his speed in metres per second.
15. A cyclist left his home at 12:55 p.m for town. At 1:35 p.m, he had covered 36km. Calculate the speed of the cyclist in metres per second.

Changing speed from metres per second to kilometres per hour

Example 1

Change 25m/s to km/h.

Distance in km

$1000m = 1km$

$25m = \frac{25}{1000}km$

Time in hours

$3600s = 1h$

$1s = \frac{1}{3600}h$

Speed in km/h

$Speed = Distance \div Time$

$Speed = \frac{25km}{1000} \div \frac{1h}{3600}$

$= \frac{25km}{1000} \times \frac{3600}{1h}$

$= 90km/h$

Example 2

An aeroplane covered 630 metres in 7 seconds. Find its speed in km/h.

Distance in km

$1000m = 1km$

$630m = \frac{630}{1000}km$

Time in hours

$3600s = 1h$

$7s = \frac{7}{3600}h$

Speed in km/h

$Speed = Distance \div Time$

$Speed = \frac{630km}{1000} \div \frac{7h}{3600}$

$= \frac{630km}{1000} \times \frac{3600}{7h}$

$= 324km/h$

Example 3

A 300m long train crossed a 1.5km bridge in 2 minutes. Calculate the speed of the train in km/h.

Distance covered in km

$1000m = 1km$

$300m = (\frac{300}{1000})km$

$= 0.3km$

$1 . 5km$

$+ 0 . 3km$

$1 . 8km$

Time in hours.

$60 \text{ minutes} = 1h$

$2 \text{ minutes} = \frac{2}{60} \text{ hours}$

Speed in km/h

$Speed = Distance \div Time$

$Speed = 1.8km \div \frac{2h}{60}$

$= \frac{18km}{10} \times \frac{60}{2h}$

$Speed = 54km/h$

Exercise

1. Change the following from metres per second to kilometres per hour.

a) 20m/s	h) 85m/s	o) 35m/s	v) 60m/s
b) 10m/s	i) 65m/s	p) 30m/s	w) 55m/s
c) 15m/s	j) 75m/s	q) 45m/s	x) 100m/s
d) 40m/s	k) 70m/s	r) 105m/s	y) 95m/s
e) 25m/s	l) 80m/s	s) 115m/s	z) 120m/s
f) 5m/s	m) 90m/s	t) 140m/s	
g) 50m/s	n) 125m/s	u) 135m/s	

2. A motorist covered 40 metres in 2 seconds. Calculate his speed in kilometres per hour.
3. A car covers a distance of 180 metres in 12 seconds. Find the speed of the car in kilometres per hour.
4. Express 200 metres covered in 8 seconds as kilometres per hour.
5. A 280m long train took 56 seconds to cross a man standing alongside the railway. Calculate the speed of the train in km/h.
6. A 1200m long train crosses a 600m long bridge in 120 seconds. Find the speed of the train in km/h.
7. A man took 6 minutes to cover a distance of 900 metres. Calculate in km/h, the speed at which the man travelled.
8. A train took 3 minutes to cross a 350m long bridge. If the train is 550 metres long, find the speed of the train in km/h.
9. A pupil walked from home at 6:55 a.m for school. She reached school which is 900 metres away from her home at 7:10 a.m. Calculate the speed of the pupil in km/h.
10. Soldiers matched for a distance of 1800 metres from 11 30h to 00 30h. Calculate their speed in kilometres per hour.
11. A bus left town P at 8:20 a.m for town Q which is 270000 metres away. It reached town Q at 11:20 a.m. Calculate its speed in Km/h.
12. The speed of a motorcyclist is 20m/s. How many hours will he take to cover a distance of 108km?
13. A taxi left town M for town N at 11:26a.m moving at an average speed of 10m/s. Town N is 144km away from town M. At what time did the taxi reach at town N?
14. Nsambya and Masaka are 135km apart. A motor cyclist left Masaka for Nsambya moving at an average speed of 15m/s. He arrived at Nsambya at 2:45 p.m. At what time did he leave Masaka?
15. It takes 2 minutes for a 600m long train to cross a tree alongside the railway. The train left station Y for station Z which is 81 kilometres away. It reached station Z at 2:20 p.m. At what time did it leave station Y?
16. The radius of a wheel of a vehicle is 35cm. The wheel makes 1000 revolutions in 88 seconds. Calculate in km/h, the speed of the vehicle. (Use $\pi = \frac{22}{7}$)

Finding average speed

Example 1

A bus takes 3 hours to cover a certain distance at 60km/h. If it returns through the same route at a speed of 90km/h, Calculate the average speed for the whole journey.

Distance

$D = S \times T$

$D = \frac{60km}{1h} \times 3h$

$D = 180km$

Returning time

$T = 180km \div \frac{90km}{1h}$

$T = 180km \times \frac{1h}{90km}$

$T = 2$ hours

Total Distance

180km + 180km

360km

Total time

3hours + 2hours

5 hours

Average speed

$\frac{\text{Total distance}}{\text{Total time taken}}$

$\frac{360km}{5h}$

72km/h

Example 2

A bus left Kampala at 07 15 hours taking people for a party at an average speed of 80km/h. The bus got a puncture at 12 15 hours and the repair took 30 minutes. The remaining journey was covered at an average speed of 60km/h in $4\frac{1}{2}$ hours. Calculate the average speed of the bus for the whole journey.

Hrs	Min
12	15
- 07	15
5	00

Time = 5 hours

Distance

$D = S \times T$

$D = \frac{80km}{1h} \times 5h$

$D = 400km$

2nd part of the journey

$D = S \times T$

$D = \frac{60km}{1h} \times 4\frac{1}{2}h$

$D = 600km \times \frac{9}{2}$

$D = 270km$

Total distance

400km + 270km

670km

Total time

$5 + (\frac{30}{60})h + 4\frac{1}{2}h$

$5 + \frac{1}{2}h + 4\frac{1}{2}h$

10 hours

Average speed

$\frac{\text{Total distance covered}}{\text{Total time taken}}$

$\frac{670km}{10h}$

67km/h

Example 3

A motorist left his home at 7:40 a.m and travelled to town for 3 hours at an average speed of 60km/h. He stayed in town for 10 minutes and then travelled back home. Calculate the average speed for the whole journey if he reached home at 3:00 pm.

Distance

$D = S \times T$

$D = \frac{60km}{1h} \times 3h$

$D = 180km$

Hrs	Min
12	00
- 7	40
4	20
+3	00
7	30

7hours 30minutes

Total distance

180km + 180km

360km

Average speed

$360km \div \frac{15}{2}h$

$360km \times \frac{2}{15h}$

48km/h

Exercise

1. A taxi travelled at a speed of 80km/h for 2 hours to cover part of the journey. It then travelled at a speed of 50km/h for 3 hours to complete the remaining part of the journey.
   a) Calculate the total distance covered.
   b) Find the average speed for the whole journey.
2. A bus takes 4 hours to cover a distance at 60km/h. It then takes only 2 hours to return through the same route.
   a) Calculate the total distance it covers.
   b) Find its average speed for the whole journey.
3. A lorry takes 6 hours to travel from the village to the market at a speed of 45km/h. It returns back to the village through the same route in 4 hours.
   a) Find the distance from the village to the market.
   b) Calculate the average speed for the whole journey.
4. Town X is 124 kilometres away from town Y. A taxi takes $2\frac{1}{2}$ hours to travel from town Y to town X and $1\frac{1}{2}$ hours going back. Calculate the average speed for the whole journey.
5. Town A is 140km from town B. A bus travelled from town B for town A at an average speed of 70km/h. It travelled back to town B in 3 hours.
   a) How long did it take to travel from town B to town A?
   b) Calculate the average speed for the whole journey.
6. A taxi travelled from town K to town L at a speed of 60km/h for $1\frac{1}{2}$ hours. It rested at town L for 30 minutes and the continued to town M at a speed of 90km/h for 1 hour. Calculate the taxis average speed for the whole journey.
7. A motorist travelled from town P to Q a distance of 96km in 3 hours. He spent 3 hours at town Q in the garage repairing the tyre. He continued to town R for 2 hours at the same speed. Calculate the average speed for the whole journey.
8. A driver drove for $2\frac{1}{2}$ hours at an average speed of 120km/h from town C to town D and then 150km/h for 3 hours 30 minutes from town D to town E.
   a) How far is town E from town C?
   b) Calculate the average speed for the whole journey.
9. Cindy travelled at a speed of 70km/h spent $3\frac{1}{2}$ hours driving. She rested for 30 minutes and drove another 60km at a speed of 40km/h.
   a) Find the total distance she covered.
   b) Calculate her average speed for the whole journey.
10. Medi travelled by bus from 12:00 noon to 3:00 p.m for 180km. He then travelled for one hour in a car whose average speed was 20km/h more than the bus.
    a) How long was the journey?

b) Calculate the total distance he covered.
c) Find the average speed for the whole journey.

11. Sebbuto left home at 9:20 a.m for Mayuge a distance of 168km. After driving for 1 hour, he rested for 40 minutes. He continued with his journey and reached Mayuge at 12:00 noon.
    a) How long was the journey?
    b) Calculate his average speed for the whole journey.
12. During a competition, Kasato took 1 hour to cycle from town E to town F at an average speed of 18km/h. He cycled back to town E at an average speed of 9km/h.
    a) Calculate the total distance he covered.
    b) Find his average speed for the whole journey.
13. Opondo walked from his home to the market at an average speed of 5km/h and took 1 hour 12 minutes. He rested for 48 minutes and returned home through the same route at 3km/h.
    a) How long did he take to travel to the market and back?
    b) Calculate his average speed for the whole journey.
14. An aeroplane travels 250km and 1200km at the speed of 500km/h and 600km/h respectively. Find its average speed for the whole journey.
15. The total distance between two stations is 570km. Out of these, the first part of the journey is covered at 56km/h and the remaining distance is covered in 2 hours at a speed of 173km/h. Find the average speed for the whole journey.
16. A motorist travelled half of his journey at 75km/h. He rested for 30 minutes and completed the remaining 150km in $1\frac{1}{2}$ hours.
    Calculate his average speed for the whole journey.
17. A man travels from city A to city B at a speed of 36km/h in 85 minutes. He rests for 50 minutes and continues from city B to city C with a speed of 180km/h in 105 minutes.
    a) Calculate the distance from city A to city C.
    b) If he left city A at 11:34 a.m, at what time did he reach city C?
    c) Calculate his average speed for the whole journey.
18. A car started its journey from town A at 8:30 a.m and reached town B at 5:30 p.m moving at an average speed of 80km/h. It returned at a speed of 120km/h to town A.
    a) At what time did it reach town A?
    b) Calculate its average speed for the whole journey.
19. A train left station X for station Z via station Y at 12:00noon moving at a speed of 25m/s to station Y. It reached station Y at 1:30 p.m where it stayed for 30 minutes and continued to station Z at 80km/h. Given that station Z is 375 kilometres away from station X.
    a) At what time did the train reach station Z?
    b) Calculate its average speed for the whole journey in km/h.

20. Kabuye drove from home to Busia at a steady speed of 80km/h for 3 hours. After a 33 minutes rest, he drove back home in $1\frac{1}{4}$ hours.
    a) Find the total distance covered for the whole journey.
    b) Determine the average speed for the whole journey.
21. A Link bus left Mutukula at 9:30 am for Kampala moving at a speed of 60km/h. After $1\frac{1}{2}$ hours, the bus broke down. The repairs took an hour and the bus continued at the same speed and reached Kampala at 2:30 p.m. Calculate the average speed for the whole journey.
22. Matia was travelling at an average speed of 45km/h for 2 hours. When he realized that he was slow, he increased the speed by 15km/h for the remaining 180km. Find the average speed for the whole journey.

More problems about finding distance, speed and time

Example 1

A car completes a journey in seven hours. It covers half of the distance at 40km/h and the remaining half at 60km/h speed. Find in km, the total distance covered.

Let the distance covered in each half be d

$$\frac{\text{Distance}}{\text{Speed}} + \frac{\text{Distance}}{\text{Speed}} = \text{Total time}$$

$$\frac{d}{40} + \frac{d}{60} = 7$$

$$(120 \times \frac{d}{40}) + (\frac{d}{60} \times 120) = 7 \times 120$$

$$3d + 2d = 840$$

$$\frac{5d}{5} = \frac{840}{5}$$

$$d = 168\text{km}$$

Total distance covered

$d + d$

$168\text{km} + 168\text{km}$

336km

Example 2

If Katumba increases his speed from 12km/h to 15km/h while coming from school to home, he reaches home 1 hour early. Find the distance between his home and school.

Let the distance be d

$$\frac{D}{S} = (\frac{D}{S}) + 1$$

$$\frac{d}{12} = (\frac{d}{15}) + 1$$

$$60 \times \frac{d}{12} = (60 \times \frac{d}{15}) + (60 \times 1)$$

$$5d = 4d + 60$$

$$5d - 4d = 4d - 4d + 60$$

$$d = 60\text{km}$$

or

Let the distance be d

$$\frac{D}{S} = (\frac{D}{S}) - 1$$

$$\frac{d}{15} = (\frac{d}{12}) - 1$$

$$60 \times \frac{d}{15} = (60 \times \frac{d}{12}) - (60 \times 1)$$

$$4d = 5d - 60$$

$$4d - 5d = 5d - 5d - 60$$

$$-d = -60$$

$$\frac{-d}{-1} = \frac{-60}{-1}$$

$$d = 60\text{km}$$

Example 3

Town X and Y are 390km apart. A car travels from X at 70km/h. At the same time, a van starts to travel at 60km/h from town Y. How far will the van be from town Y when they meet.

Let the time taken for the two vehicles to meet be t

Value of t

Car + Van = Total distance

$(S \times T) + (S \times T) = D$

$(70 \times t) + (60 \times t) = 390$

$70t + 60t = 390$

$\frac{130t}{130} = \frac{390}{130}$

$t = 3$ hours

Distance covered by the van

$(60t)$km

(60×3)km

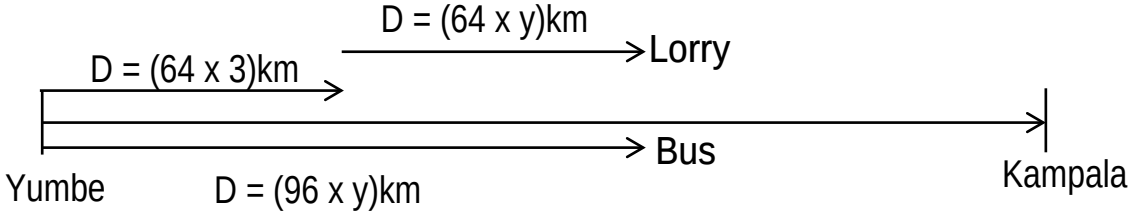
180km

Example 4

At 5:25a.m, a lorry travelling at a speed of 64km/h left Yumbe for Kampala. 3 hours later, a bus travelling at an average speed of 96km/h begins its journey from Yumbe taking the same route. At what time will the bus catch up the lorry?

Let the time taken for the bus to catch up the lorry be y

Distance covered by the bus = Distance covered by the lorry



Value of y

$S \times T = (S \times T) + (S \times T)$

$(96 \times y) = (64 \times 3) + (64 \times y)$

$96y = 192 + 64y$

$96y - 64y = 192 + 64y - 64y$

$32y = 192$

$\frac{32y}{32} = \frac{192}{32}$

$y = 6$ hours

Total time taken by the lorry.

3 hours + 6 hours = 9 hours

Hrs	Min
5	25
+ 9	00
14	25
- 12	00
2 :	25p.m

At 2:25p.m

Example 5

Town M is 240 kilometres away from town N. A bus and a taxi left town M from town N at 3:45 p.m. The bus was moving at an average speed of 72 kilometres per hour. At 4:30 p.m, the bus was 18 kilometres ahead. At what time did the taxi reach town N travelling at the same speed?

Time taken

Hrs	Mins
4	30
- 3	45
0	45

$T = \frac{3}{4}$ hours

Bus

$D = S \times T$

$D = \frac{72km}{1h} \times \frac{3}{4}h$

$D = 54km$

Taxi

54km – 18km

36km

Speed of the taxi

$S = D \div T$

$S = 36km \div \frac{3}{4}h$

$S = 36km \times \frac{4}{3h}$

$S = 48km/h$

Total time taken by the taxi

$T = D \div S$

$T = 240km \div \frac{48km}{1h}$

$T = 240km \times \frac{1h}{48km}$

$T = 5$ hours

Arrival time

Hrs	Mins
3	45
+5	00
8	45

At 8:45 p.m

Group activity

1. Olando can complete a journey in 8 hours. He travels half of the journey at a speed of 20km/h and the other half at a speed of 60km/h.
   Find the total distance covered in kilometres per hour.
2. Two drivers; Kamasu and Otia drove from town X to town Y a distance of 480km. They started the journey at 7:00 a.m. Kamasu drove at a constant speed and reached town Y at 1:00 pm. Otia drove at an average speed of 60km/h.
   a) Calculate Kamasu's speed in km/h.
   b) How far from town Y was Otia when Kamasu arrived?
3. Kafembo made a 105 kilometres journey. For the first 90km, she used a bus travelling at an average speed of 60km/h and for the remaining journey, she took a taxi travelling at an average speed of 90km/h. She reached her destination at 1:10 p.m. At what time did she start the journey?
4. A cyclist set out to travel from town N to town P. After travelling for 1 hour 30 minutes, he had a tyre puncture which took him 30 minutes to repair. He then continued with the journey for 50 minutes. If his average speed for the whole journey was 18km/h, how far is town P from town N?
5. Running at a speed of 60km/h, a train passed through a 1.5km tunnel in 2 minutes. Find in metres, the length of the train.
6. A student goes to school from home at a speed of 5km/h and reaches 12 minutes late. If he travels at the speed of 8km/h, he is 15 minutes early. Find the distance between his school and home.

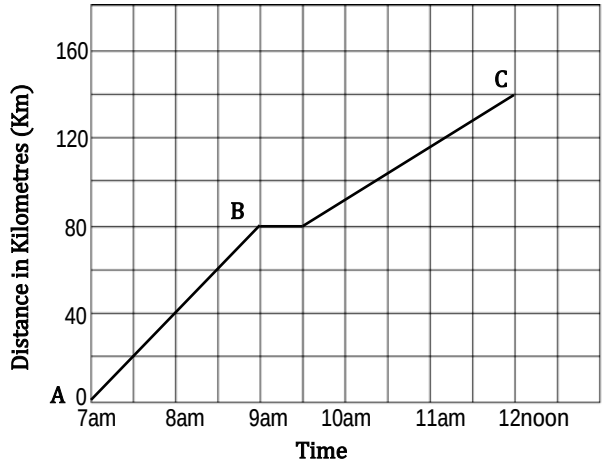
7. The distance between two towns is covered in 7 hours 30 minutes at the speed of 72km/h. At what speed must the same distance be covered to save $1\frac{1}{2}$ hours?
8. A thief was spotted by a police man from a distance of 312 metres. When the police man started the chase, the thief also started. The speed of the police man and the thief was 8m/s and 5m/s respectively. How far would the thief have run before the police man caught him?
9. In a flight of 2 hours, an aeroplane travels a third of the time at 780km/h and the remaining time at 810km/h. What is the total distance covered?
10. A rectangular field is 87 metres by 63 metres. A man walks around it at a speed of 3km/h. How many minutes will he take to make 2 round?
11. A bus travelling at 42km/h covers a distance in 5 hours. How many minutes would it save if it increased its speed by 8km/h?
12. A train travels between two stations X and Z a distance of 120 kilometres in 80 minutes. It passes station Y, 1 hour after leaving X. What is the distance between Y and Z?
13. A car travelled for 90 minutes at 60km/h and then for 30 minutes at 40km/h.
    a) Find the total distance covered.
    b) What was the average speed for the whole journey?
14. Kizito and his brother left home for school at 5:20 a.m on a bicycle. Kizito's brother rode the first part of the journey at 3km/h. Kizito rode the remaining part at 6km/h. They reached school after covering 18km. At what time did they reach school?
15. At 1:30 p.m, Tom leaves Kyotera travelling at 24km/h. Twenty minutes later, Francis leaves the same place travelling at 28km/h heading for Tom. At what time will Francis catch up with Tom?
16. A motorist took 3 hours to travel from Masaka to Kampala, it then took 4 hours to travel back to Masaka at an average speed of 30km/h. At what speed did the motorist travel to Kampala?
17. At 11:00 a.m, a bus and taxi left town A for town B moving at a speed of 50km/h and 30km/h. At what time will they be 60km apart?
18. A taxi left town P for town Q moving at an average speed of 75km/h. It immediately returned back to town P at an average speed of 50km/h. It took 5 hours to cover the whole journey. How far is town Q from town P?
19. Two motorists Kato and Waswa left Kamwokya for Kabira from the same place at 9:55 a.m. Kato travelled at 90km/h while Waswa travelled at an average speed of 72km/h.
    a) How far apart were the two after the first 40 minutes of travelling?
    b) If Kato reached Kabira at 11:07 a.m, how long did Waswa take to travel from Kamwokya to Kabira?
20. Biswanka runs at an average speed of 24km/h. He started a 160,000 metre race at 11:30 a.m. At what time did he cross the 120,000 metre mark?

21. A motorcyclist left town Q for town P at 10:20 a.m travelling at a speed of 80km/h to town P. He rested for 1 hour and drove back through the same route at an average speed of 60km/h. He reached town Q at 6:20 p.m.
    a) How far is town P from town Q?
    b) Calculate his average speed for the whole journey.

TRAVEL GRAPHS

Example 1

A motorist drove from town A to town C via town B. Study the graph below and use it to answer questions that follow.



a) What is the scale on the vertical axis?

$\frac{40km}{2} = 20km$

1square represents 20km

b) What is the scale on horizontal axis?

$\frac{1hour}{2} = \frac{1}{2}h$ or 30 minutes

1square represents 30 minutes

c) How far is town C from town B?

140km – 80km = 60km

OR

3 x 20km = 60km

d) For how long did the motorist stay at town B?

$$\begin{array}{r} 9 \quad 30 \\ -\ 9 \quad 00 \\ \hline 0 \quad 30 \end{array}$$

The motorist stayed at B for 30 minutes

e) What is the motorist's average speed for the whole journey?

Total distance = 140km

Total time taken = 5 hours

$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{140km}{5h}$

$= 28km/h$

f) If the motorist travelled back to town A at an average speed of 56km/h, at what time did he reach town A?

Time = Distance ÷ Speed

$\text{Time} = 140km \div \frac{56km}{1h}$

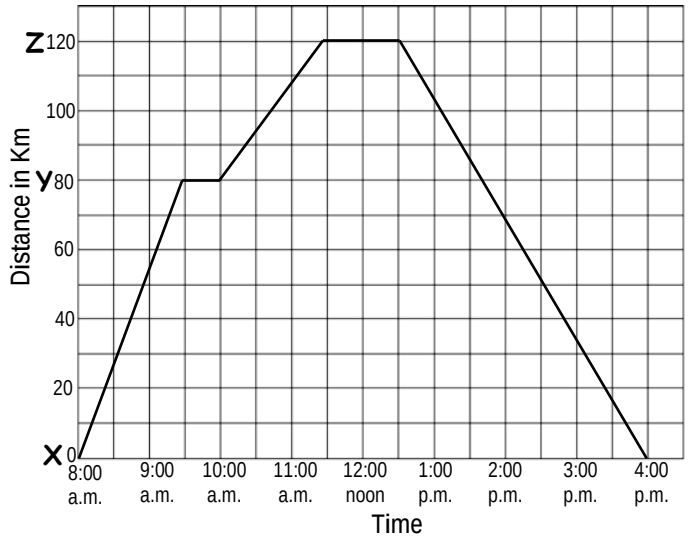
$\text{Time} = 140km \times \frac{1h}{56km}$

$\text{Time} = 2\frac{1}{2}$ hours

Arrival time

Example 2

The graph below shows the journey of a motorist from town X to town Z via town Y and back to town X. Study it carefully and use it to answer questions that follow.



a) How far is town Y from town Z?

120km – 80km = 40km

b) For how long did the motorist stop on the way.

$\frac{1}{2}$ hour + 1 hour = $1\frac{1}{2}$ hour

c) At what time did the motorist reach town Z?

At 11:30 a.m.

d) Express the arrival time of the motorist at town Y in 24 hour clock system.

Hrs	Mins
9	30
+ 00	00
09	30 hours

e) Calculate the average speed for the whole journey.

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

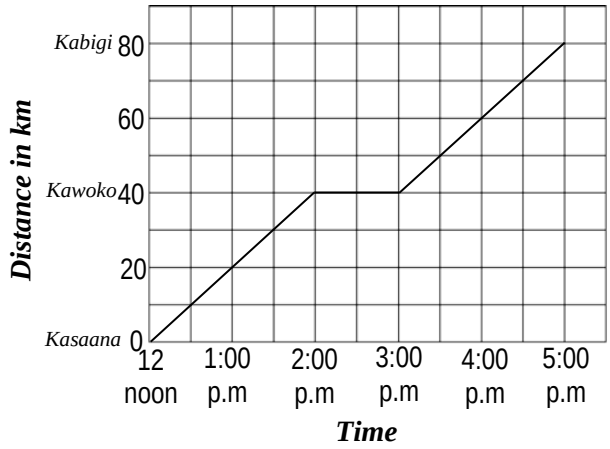
$$= \frac{120\text{km} + 120\text{km}}{8\text{h}}$$

$$= \frac{240\text{km}}{8\text{h}}$$

$$= 30\text{km/h}$$

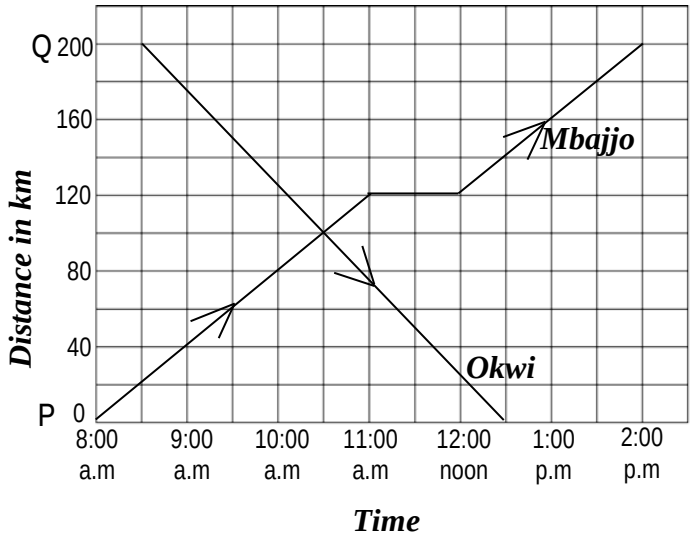
Exercise

1. The graph below represents a motorist's journey from Kasaana to Kabigi via Kawoko. Use it to answer questions that follow.



a) What is the scale on
   i) horizontal axis?
   ii) vertical axis?
b) How far is Kabigi from Kawoko?
c) For how long did he rest?
d) How far is Kabigi from Kasaana?
e) At what time did the motorist start the journey?
f) At what speed was the motorist riding between Kasaana and Kawoko?
g) How many hours did the whole journey take?
h) Calculate the average speed for the whole journey.

2. The graph below shows the journeys made by Okwi and Mbajjo between towns P and Q which are 200 metres apart. Okwi left town Q at 8:30 a.m and drove at a steady speed to town P. Mbajjo left town P at 8:00 a.m and drove as shown on the graph.



a) Express the arrival time of Okwi to town P in 24 hour clock.

b) Find Okwi's speed in km/h.

c) At what time did Okwi and Mbajjo at meet?

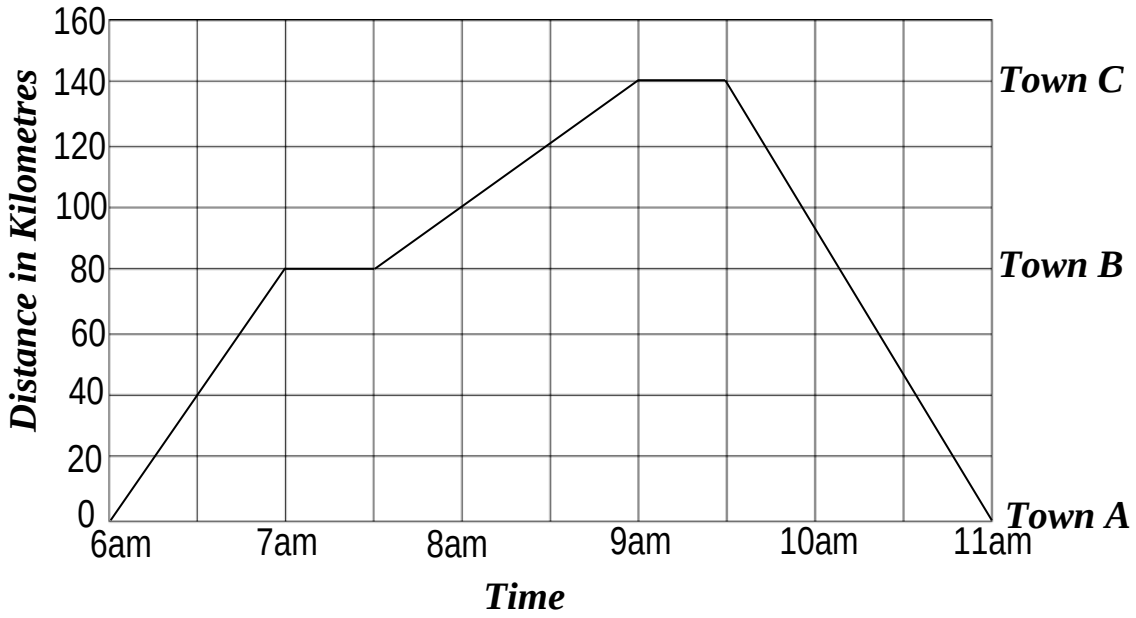
d) What distance had Okwi covered by 9:30 p.m?

e) How far from town Q was Mbajjo at 12:30 a.m?

f) Find Mbajjo's average speed after resting.

g) Calculate Mbajjo's average speed for the whole journey.

3. The graph below shows a journey made by a cyclist from town A to town C via town B and the return journey. Use it to answer questions that follow



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a) How far is town B from town C?

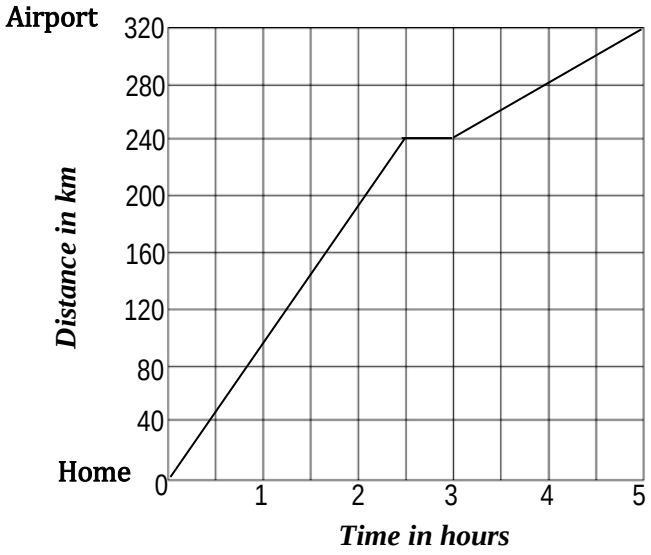
b) At what time did he leave town C back to town A?

c) What distance had the cyclist covered by 8:30a.m?

d) Find the total resting time.

e) Calculate the cyclist's average speed for the whole journey.

5. Joan drove 320km from her home to Entebbe airport . During the journey, she stopped for lunch. The graph shows Joan's journey.



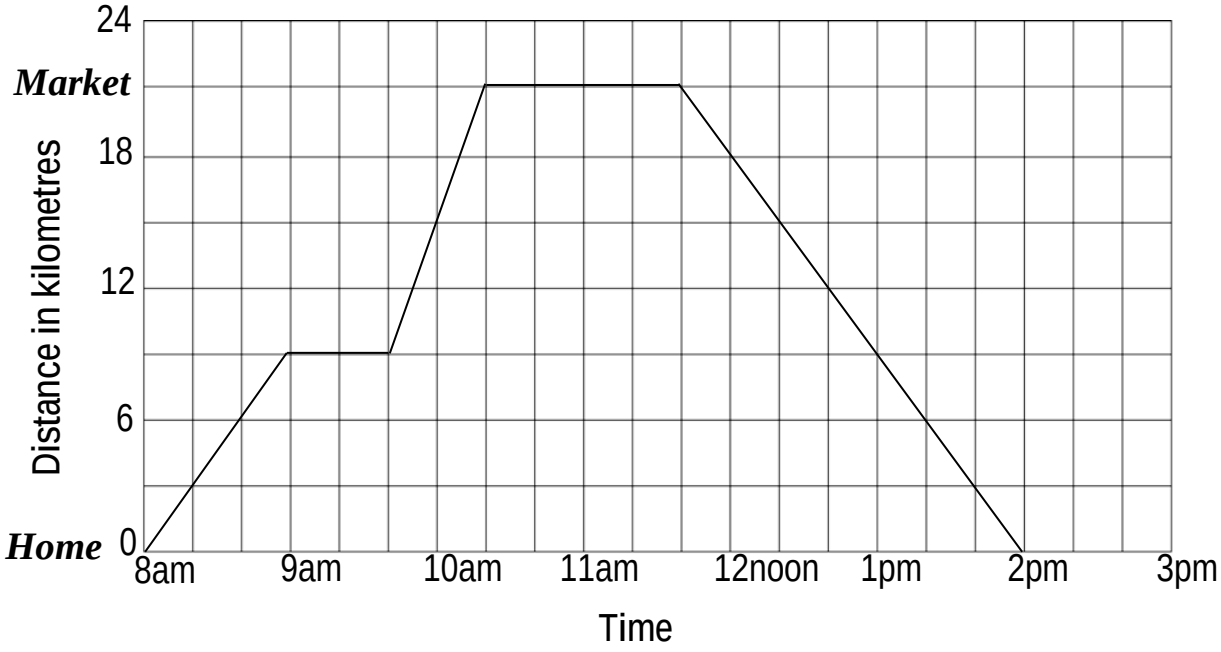
a) For how long did she stop for lunch?

b) How far had Joan travelled in the first 90 minutes?

c) Workout the steady speed Jane travelled after lunch.

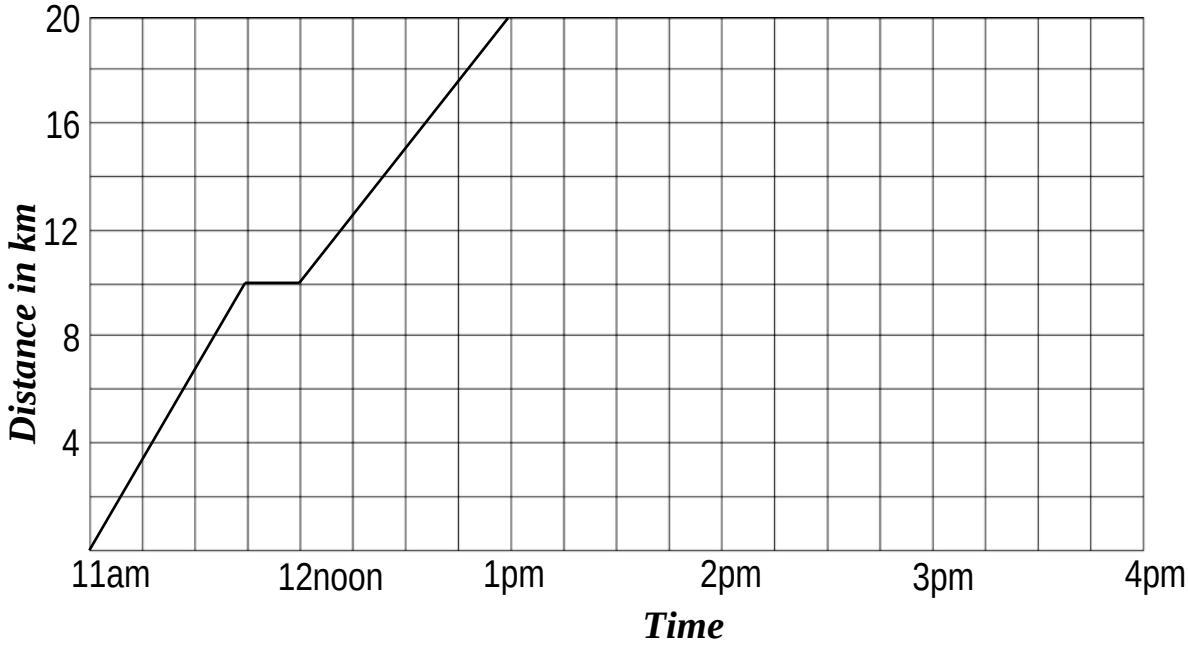
d) Joan car uses 6 litres of petrol to cover 8km. A litre of petrol costs sh. 5500. Find the cost of the petrol for Joan's 320km journey.

4. The graph below shows Kalungi's journey from home to the market and back home. Use it to answer questions that follow.



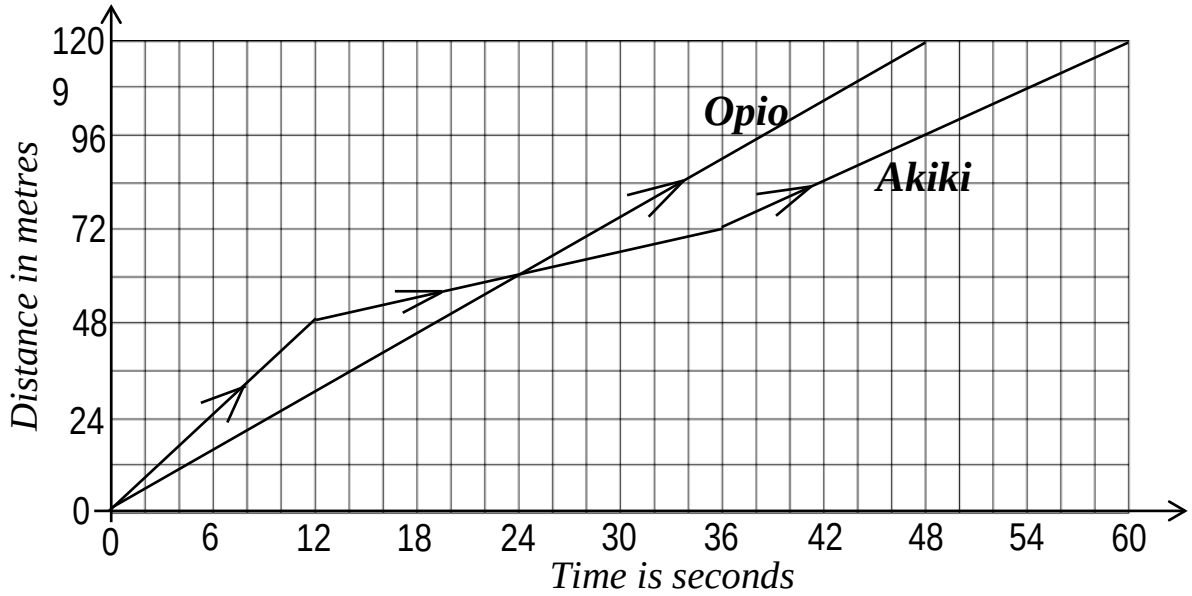
a) Find the total resting time.
b) What distance had he covered by 9:35a.m?
c) How far away from the market was Kalungi at 10:00a.m?
d) At what speed did he travel back home from the market?
e) Express as 24 hour clock, the time Kalungi reached to the market.
f) What distance in metres, did he cover altogether?
g) Calculate his average speed for the whole journey in km/h.

6. Amooti left home at 11:00a.m to go for a cycle ride. The graph below represents part of his journey.



a) For how many minutes did Amooti rest?
b) Find the distance from home at 12:30p.m.
c) Amooti stopped for another rest at 1:00 p.m. He rested for 1 hour. Then continued at a steady speed for 2 hours back home. Complete the graph.
d) Calculate Amooti's average speed for the whole journey.

7. Akiki and Opio set off for a 120 metre race as represented on the graph below.



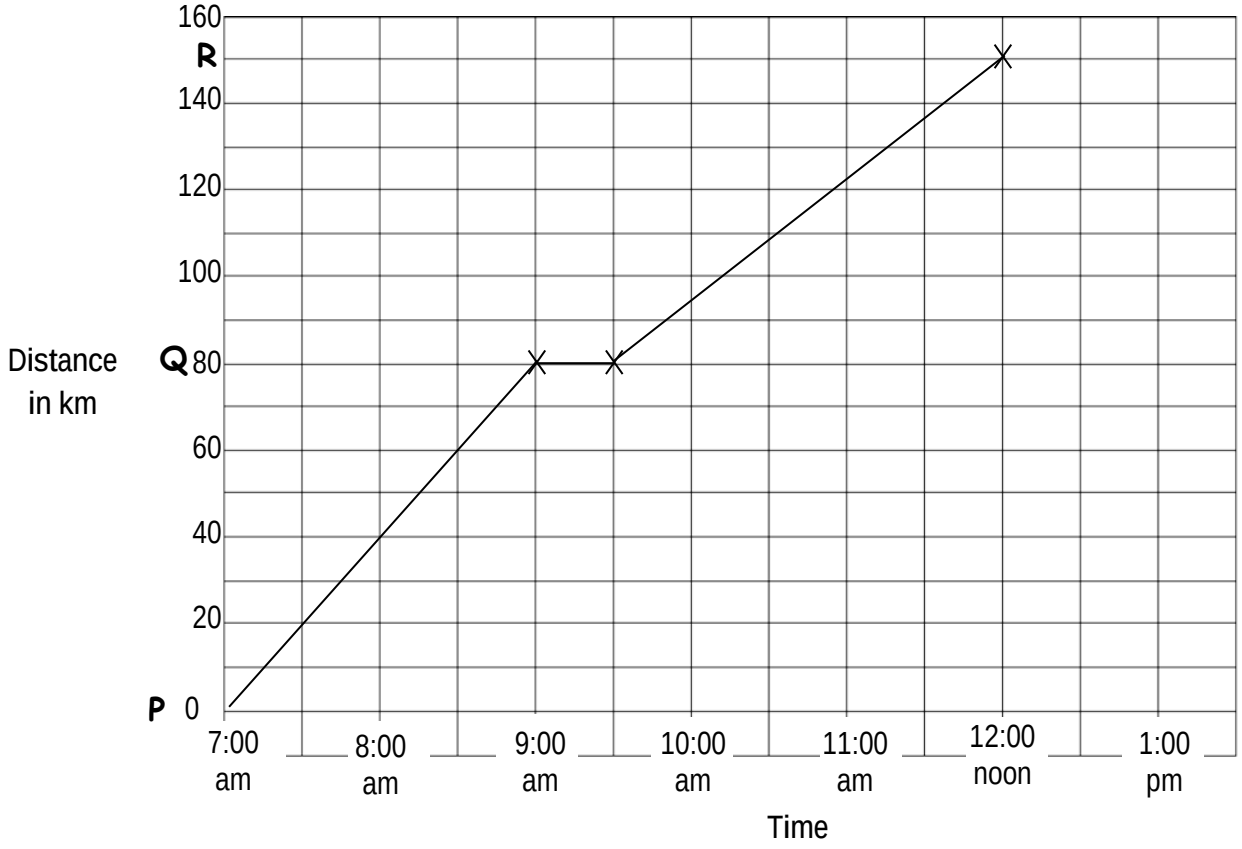
a) Who won the race?
b) For how long did Opio run?
c) How long did it take Opio to catch up with Akiki?
d) Calculate Opio's speed in kilometres per hour.
e) Calculate Akiki's average speed for whole journey in m/s.

Drawing travel graphs

Example

Assumpta drove from town P at 7:00a.m moving to town Q a distance of 80km in 2 hours. She rested for 30 minutes at Q and continued to town R a distance of 70km in $2\frac{1}{2}$ hours.

a) Represent Assumpta's journey on the graph below.



b) How far is town R from town Q?

150km – 80km = 70km

c) What was the motorist's average speed for the whole journey?

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{150\text{km}}{2\text{h} + \frac{1}{2}\text{h} + 2\frac{1}{2}\text{h}}$$

$$= \frac{150\text{km}}{5\text{h}}$$

$$= 30\text{km/h}$$

Exercise

1. Towns A and C are 360km apart. A motorist travelled from A to B for 2 hours a distance of 160km. He rested for 1 hour and continued to C from 2 hours. The motorist left town A at 9:00a.m.
   a) Represent the motorist's journey on a graph town A at 9:00 a.m.
   b) Calculate the motorist's average speed for the whole journey.

2. Hoima is 200km from Kampala. A bus left Kampala at 8:00a.m travelling at an average speed of 40km/h for 3 hours. It rested for 1 hour. It then continued for 2 hours to Hoima.
   a) Represent its journey on a graph.
   b) Calculate the average speed of the bus for the whole journey.

3. Town P is 150km from town Q. A motorist started a journey from town P at 9:30 a.m. He was travelling at a speed of 25km/h for 2 hours. He rested for 30 minutes and then continued at a speed of 50km/h for the rest of the journey to town Q.
   a) Represent the motorist's journey on a graph.
   b) Calculate the motorist's average speed for the whole journey.

4. A motorist left town P for town Q at 7:30a.m travelling at a speed of 40km/h for $2\frac{1}{2}$ hours. He rested at Q for 30 minutes and then returned to town P reaching at 1:00 p.m.
   a) Show the motorist's journey on a graph.
   b) Calculate the motorist's average speed for the whole journey.

5. A motorist started his journey from village A at 7:20a.m and drove a car at 12km/h for 40 minutes to reach village B where he rested for 20 minutes. He continued to town C at a speed of 6km/h to cover 8km between B and C.
   a) Represent the motorist's journey on the graph.
   b) What was the total time the motorist took on the journey?

6. Fort portal is 180km from Mbarara. A car left Fort portal at 12:00 noon. It took $3\frac{1}{2}$ hours to reach Mbarara where it stayed for half an hour and went back to Fort portal in only 2 hours.
   a) Show its journey on a graph.
   b) Calculate its average speed for the whole journey.

7. A lorry that left Lyantonde at 7:30a.m, took 4 hours to reach Kampala where it stayed for 1 hour and returned to Lyantonde in 5 hours.
   a) Show its journey on a graph.
   b) Calculate its average speed for the whole journey.

8. A Kabondole bus left Kampala at 7:30a.m moving at an average speed of 60km per hour. It broke down after $2\frac{1}{2}$ hours drive. The repair took 30 minutes. The bus continued with the journey at an average speed of 50km per hour for an hour.
   a) Find the distance covered by the bus.
   b) Show its journey on the graph.
   c) Find the average speed of the bus over the whole journey.

9. Kakembo rode a bicycle from town E to town G through town F as follows. He rode from E to F a distance of 30km for 3 hours and the rested for $\frac{1}{2}$ an hour. From F, he rode to G a distance of 20km in $2\frac{1}{2}$ hours. On a graph, draw a line to show Kakembo's movement . Also show towns E, F and G.

10. Joan started her journey from town A for town C at 8:30a.m. She drove from town A to town B a distance of 120km in 2 hours. She rested for 30 minutes at town B. She continued to town C at the same speed for $1\frac{1}{2}$ hours.
    a) How far is town C from town A?
    b) Show her journey on a graph.
    c) Calculate her average speed for the whole journey.

11. Nusurah left town P at 7:00a.m and drove at 55km per hour for 2 hours to town Q. She rested for 30 minutes at town Q. She left town Q and drove for $1\frac{1}{2}$ hours at 40km per hour to town R. She rested for 30 minutes at town R and then drove back to town P at an average speed of 75km/h.
    a) Draw Nusurah's journey on a graph.
    b) Calculate the average speed for the whole journey.

12. Tr. Mpamire drove from school to town Q for 3 hours at an average speed of 60km/h. He rested at town Q for 1 hour. He left town P at 10:30a.m and drove back to school through the same route at an average speed of 90km/h.
    a) At what time did he leave the school for town Q?
    b) Show his journey on a graph.
    c) Calculate Tr. Mpamire's average speed for the whole journey.

13. Murungi left village K at 9:00a.m and drove at 90km/h for 1 hour to village L. She rested for half an hour at village L. She left village L and drove for 1 hour at 70km/h to village M. She rested for 30 minutes at village M. She then left village M and drove back to village K at an average speed of 40km/h.
    a) Draw Murungi's journey on a graph.
    b) Calculate Murungi's average speed for the whole journey.

14. Alex and Ben made journeys between towns M and N which are 200 kilometres apart. Alex left town M at 8:00a.m and drove at an average speed of 50km/h to town N. Kato left town N at the same time and covered a distance of 60km at a steady speed in 1 hour. He rested for half an hour after which he drove for $2\frac{1}{2}$ hours to town M.
    a) Show the journeys made by two people on a graph.
    b) At what time did Alex and Ben meet?
    c) Find Ben's average speed for the whole journey.

15. Ssanyu left Kampala at 9:30a.m driving a truck at an average speed of 40km/h for 2 hours to Jinja. He rested for 1 hour at Jinja, then continued to his home at an average speed of 50km per hour for another 2 hours.
    a) Show Ssanyu's journey on a graph.
    b) Calculate Ssanyu's average speed for the whole journey.

16. A bus left Kampala for Mombasa at 08 30 hours at an average speed of 80 kilometres per hour. The bus got a puncture at Mbale at 13 30 hours and the repair took 30 minutes. The remaining journey was covered at an average speed of 4 hours 30 minutes at an average speed of 60 kilometres per hour.
    a) Represent it's journey on a graph.
    b) Calculate the average speed of the bus for the whole journey.

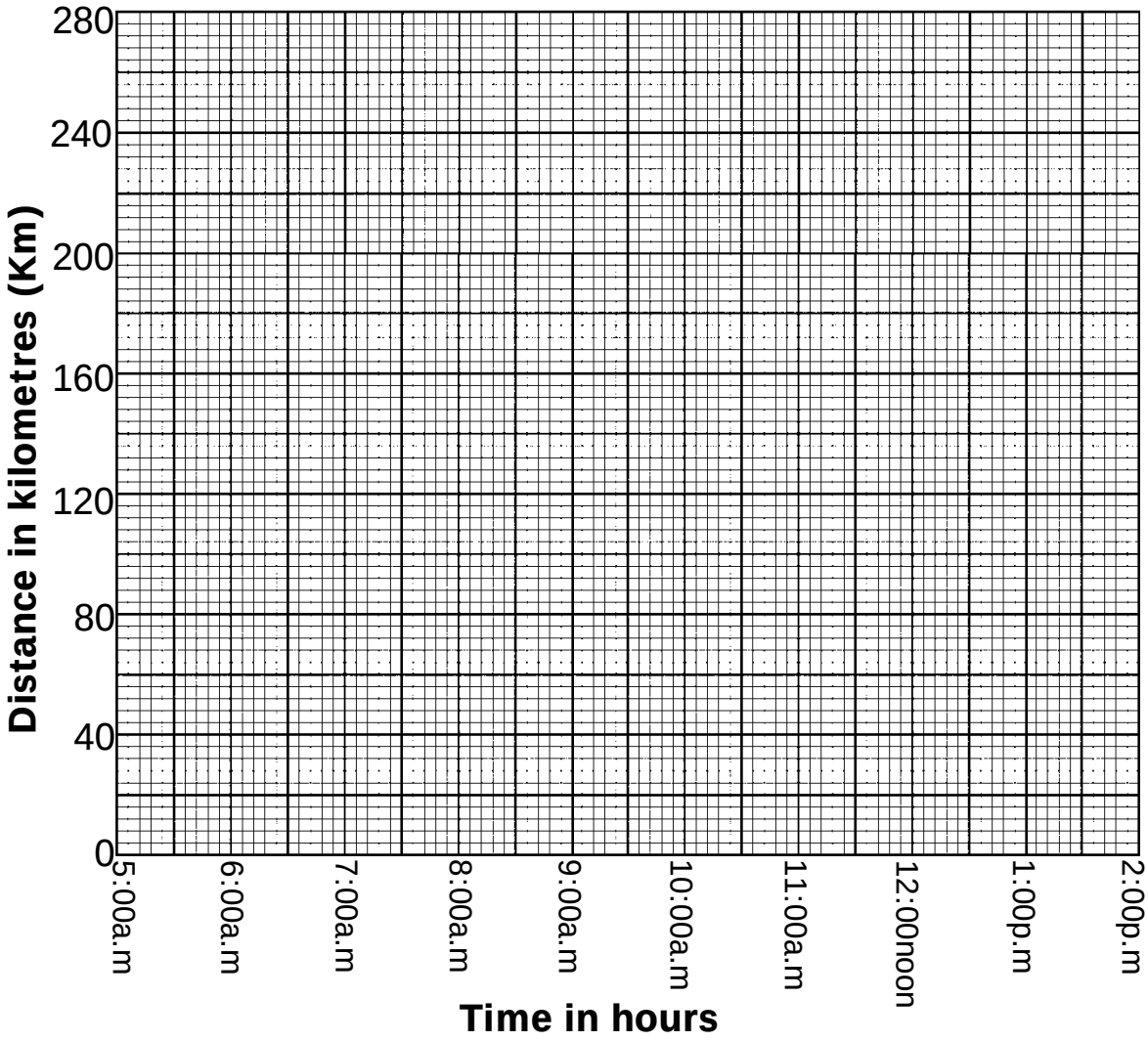
17. A car started its journey from town A at 8:30a.m and reached town B at 5:30p.m covering a distance of 720km It rested for 30 minutes and returned at an average speed of 120km/h.
    a) Find the total distance covered.
    b) Draw a graph and show the car's journey.

18. Harriet left her home for town P at 8:30a.m. She travelled at an average speed of 70km/h for $3\frac{1}{2}$ hours. She rested for 30 minutes and continued to town P a distance of 30km at a speed of 60km/h.
    a) Draw a graph and show her journey.
    b) Find her average speed for the whole journey.

19. Betty leaves Town Q at 9:30a.m, she travels for 2 hours at 20km/h. She rests for 1 hour and then continues with her journey at 10km/h for 5 hours. Alex leaves Town Q at 12:30p.m and goes after Betty, he catches up with her at Town R at 2:30p.m.
    a) Draw a graph to show the journeys for Betty and Alex.
    b) What was Alex's average speed?

20. Travor travelled from town A to town C via town B. He started his journey at 5:30a.m travelling at an average speed of 50km/h for 2 hours to town B. He rested for 60 minutes and continued to town C at a speed of 60km/h for 1 hour. After resting for an hour at town C, he drove directly back to town A at an average speed of 80km/h.

(a) Show the journey covered by Travor on the grid below.



(b) How far is Town C from Town A?
(c) express the arrival time at Town C in 24 hour clock.
(d) At what time did he reach Town A?
(e) Calculate his average speed for the whole journey.