

Q1. Stuart drives 180 km in 2 hours 15 minutes.

Work out Stuart's average speed.

..... km/h

(Total 3 marks)

Q2. John travelled 30 km in 1.5 hours.
Kamala travelled 42 km in 2 hours.

Who had the greater average speed?
You must show your working.

.....

(Total 3 marks)

- Q3.** Sarah goes to the gym on her way to work.
The table shows what she wants to do before arriving at work.

Activity	Time (mins)
Drive from home to gym	10
Exercise at gym	45
Shower and change	20
Drive from gym to work	25

She has to arrive at work at 08 50

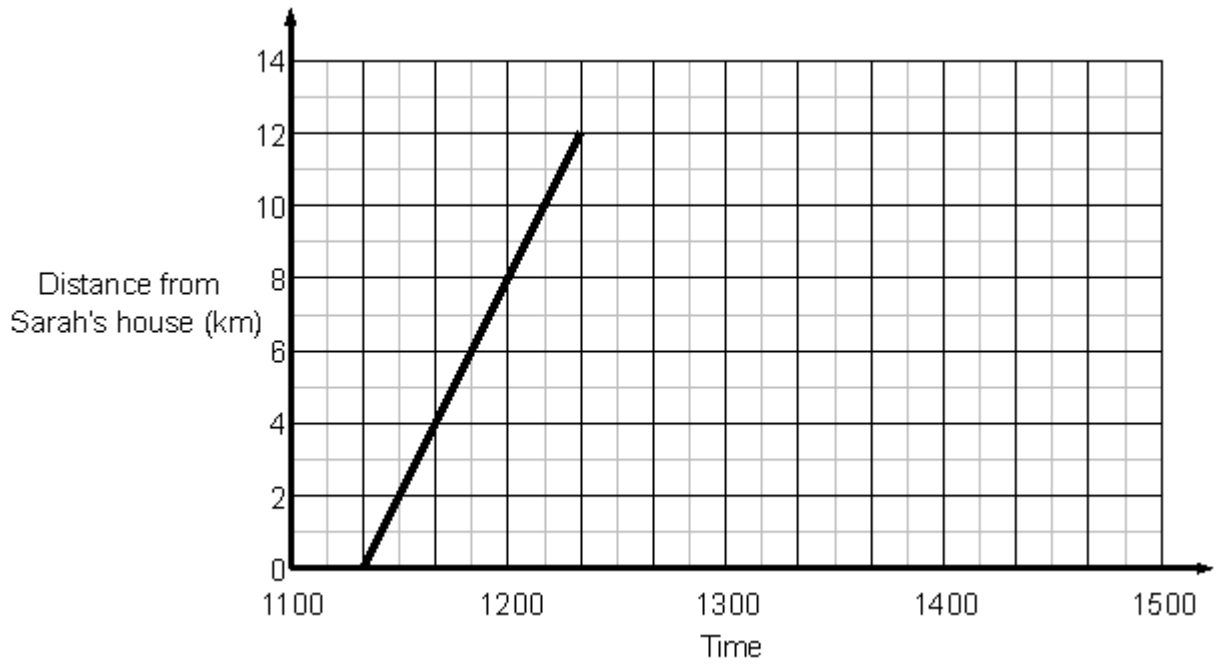
- (a) What is the latest time she can leave home?

.....

(3)

Each Saturday, Sarah cycles from her house to the gym.

The travel graph shows Sarah's journey to the gym.



(b) What time does she leave home?

.....

(1)

(c) How far is the gym from Sarah's house?

..... km

(1)

Sarah stays at the gym for $1\frac{1}{2}$ hours.

She then cycles back to her house at 18 km/h.

(d) Complete the travel graph.

(3)
(Total 8 marks)

Q4. A plane takes 30 seconds to fly a distance of 8 kilometres.

Work out the average speed of the plane, in miles per hour.

..... miles per hour

(Total 3 marks)

Q5. There are 40 litres of water in a barrel.

The water flows out of the barrel at a rate of 125 millilitres per second.

1 litre = 1000 millilitres.

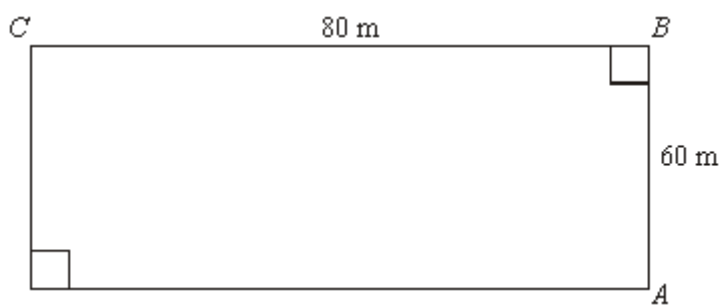
Work out the time it takes for the barrel to empty completely.

..... seconds

(Total 3 marks)

- Q6.** Alan and Bhavana are planning their fitness program.
They plan to run on parts of a field.
The diagram below shows a rectangular field 80 metres by 60 metres.

Diagram **NOT**
accurately drawn



Alan runs **around** the field from A to C (via B) at 5 m/s.

Bhavana runs directly across the diagonal of the field from A to C at 3 m/s.

If they both started at the same time, who would reach point C first?

You must explain your answer.

.....

.....

(Total 6 marks)

M1.

Working	Answer	Mark	Additional Guidance
$180 \div 2.25$	80	3	M1 for $180 \div 2$ hr 15 mins or $180 \div 2.15$ or $180 \div 135$ M1 for $180 \div 2.25$ or $180 \div 2\frac{1}{4}$ or " $1.3(33)$ " $\times 60$ A1 for 80 <div style="text-align: right;">$\frac{3600}{43}$</div> SC B1 for 83.72 or $\frac{3600}{43}$ or 1.3(333...)
Total for Question: 3 marks			

M2.

Working	Answer	Mark	Additional Guidance
$\frac{30}{1.5} = 20$ $\frac{42}{2} = 21$	Kamala	3	<div style="text-align: center;">$\frac{30}{1.5}$ $\frac{42}{2}$</div> M1 for $\frac{30}{1.5}$ or $\frac{42}{2}$ (accept minutes) A1 for 20 and 21 A1 for Kamala cao Note: answer only scores M0 A0 A0 Alternative method: M1 for 10 km in 0.5 hours A1 for 40 km in 2 hours A1 for Kamala cao OR M1 for 10.5 km in 0.5 hours A1 for 31.5 km in 1.5 hours A1 for Kamala cao OR M1 for 60 km in 3 hours or 63 km in 3 hours A1 for 60 km in 3 hours and 63 km in 3 hours A1 for Kamala cao

			OR M1 for 10 km in 30 minutes or 10.5 km in 30 minutes A1 for 60 km in 30 minutes and 10.5 km in 30 minutes A1 for Kamala cao
Total for Question: 3 marks			

M3.

	Working	Answer	Mark	Additional Guidance
(a)	$10 + 45 + 20 + 25 = 10$ 1 hour 40 minutes	07 10	3	M1 for $10 + 45 + 20 + 25$ or 100 seen M1 for correct attempt to convert to hours and minutes A1 cao OR M2 for clear attempt to subtract all times from 08 50 (may be seen as working backwards) (M1 for clear attempt to take at least one time away from 08 50) A1 cao
(b)		11 20	1	B1 for 11 20 or twenty past eleven oe
(c)		12	1	B1 cao
(d)		Straight line from (12 20, 12) to (13 50, 12) and from (13 50, 12) to (14 30, 0)	3	M1 for straight line segment on graph M1 for straight line with negative segment A1 for correct graph or M1 for straight line segment on graph M1 for $12 \div 18$ oe or 40 minutes seen A1 for correct graph SC: B2 for the correct straight line translated to left or right
Total for Question: 8 marks				

M4.

Working	Answer	Mark	Additional Guidance
8 km per 30 seconds = 16 km per minute = $16 \times 60 = 960$ km per hour $960 \text{ km/hr} \times 5 \div 8 = 600$ miles per hour	600	3	M1 convert to km/h by $\times 2 \times 60$ or 960 seen or use of speed = distance \div time M1 convert distance to miles by $\times 5 \div 8$ or sight of 5 miles A1 cao
Total for Question: 3 marks			

M5.

Working	Answer	Mark	Additional Guidance
$\frac{40000}{125} = \frac{8000}{25}$ = 320 seconds	320	3	M1 for 40×1000 or $125 \div 1000$ or 40000 or 0.125 $\frac{40000}{125}$ or $\frac{40}{0.125}$ M1 for A1 cao OR M1 for $1000 \div 125$ M1 for '8' $\times 40$ A1 cao
Total for Question: 3 marks			

M6.

	Working	Answer	Mark	Additional Guidance
QWC ii	$60 + 80 = 140$ $140 \div 5 = 28$ $60^2 + 80^2 = 10000$ $\sqrt{10000} = 100$ $100 \div 3 = 33.33333\dots$	Alan, with statement supporting explanation	6	B1 Alan runs 140 M1 '140' \div 5 M1 $60^2 + 80^2$ A1 100 A1 28 or 33.33333... seen C1 Alan stated with comparison of times and times attributed to correct person QWC: Decision stated with statement supporting explanation
Total for Question: 6 marks				

E1. Foundation

This question was not well answered. Most candidates did divide 180 km by 2hrs 15 minutes but put $180 \div 2.15$ into their calculator to give the answer of 83.72 or used $180 \div 135$ to give 1.33... These candidates were rewarded with one mark for recognising that speed is distance divided by time. Very few candidates were able to give the correct answer of 80 km per hour.

Higher

This question was well understood but not well answered. Most candidates did divide 180 km by 2hrs 15 minutes but put $180 \div 2.15$ into their calculator to give the answer of 83.72 or used $180 \div 135$ to give 1.33... These candidates were rewarded with one mark for recognising that speed is distance divided by time. Only the more able candidates were able to give the correct answer of 80 km per hour for dealing correctly with dividing by fractions of an hour.

- E2.** This question was well answered by the more able candidates with many calculating the average speeds correctly before making the correct conclusion. Other methods such as considering the distance covered by each of John and Kamala in 30 minutes were often employed successfully. A significant number of candidates divided the time taken by the distance travelled but were then unable to convince examiners that they understood what they were doing by making the correct conclusion. Weaker candidates often multiplied the distance travelled by the time taken. No marks could be awarded to candidates who failed to show any working.

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In part (a) candidates adopted two approaches. Some added up the times, and then attempted a subtraction from 08 50, but $08\ 50 - 100$ required some conversion of minutes into hours and minutes, which some found too difficult. The second method was to start with 08 50 and successively subtract each of the four times, which was far better done. Parts (b) and (c) were well answered. In part (d) two lines needed to be drawn. Most realised that a horizontal section was needed, but of these many terminated the line before 13 50. The majority inserted the

correct sloping line, with only a minority drawing a line of incorrect gradient, or of positive gradient (disappearing off the top of the graph).

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Many candidates knew that there was a relationship between speed, distance and time with the formula triangle diagram often seen although sometimes with speed or time at the top of the triangle. The most common error was either multiplying 30 by 8 or dividing 30 by 8.

Over half the candidates failed to score on this question even though it was seldom left blank. A third of the candidates did score 1 mark generally for successfully calculating 960 km/h but then progressed no further. The conversion from kilometres to miles was not well known. Many who wrote 5 miles = 8 km or 1 mile = 1.6 km often did not know how to apply this knowledge. Just under 10% of the candidates reached an answer of 600 miles per hour. In this type of question candidates should be encouraged to use common sense and to check that their answer is of a reasonable size for the vehicle being considered.

E5. There were two main methods used for answering this question. The first, converting 40 litres to millilitres and then dividing by 125 posed problems for candidates in the evaluation. Often, the number of millilitres was incorrect with 40×1000 frequently being evaluated as 4000. The subsequent division by 125 was very poorly attempted or, in some cases, not attempted. Too often the answer found by using this method was incorrect. The second method, finding the number of seconds for one litre, i.e. dividing 1000 by 125, and then multiplying by 40, usually led to the correct answer. There were frequent attempts at repeated addition rather than division and these often resulted in incorrect answers. Sometimes a mixture of the two methods was seen in this question.