Edexcel GCSE
Mathematics (Linear) – 1MA0

COMPOUND MEASURES

Materials required for examination
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions
Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

Information
The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.
Questions labelled with an asterisk (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice
Read each question carefully before you start to answer it.
Keep an eye on the time.
Try to answer every question.
Check your answers if you have time at the end.
1. Adam cycled 24 km in 2 hours.

Work out his average speed.

\[
\text{Speed} = \frac{\text{distance}}{\text{time}}
\]
\[
= \frac{24}{2}
\]
\[
= 12 \text{ km/h}
\]

(Total 2 marks)

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

Work out Stuart’s average speed.

\[
\text{Speed} = \frac{\text{distance}}{\text{time}}
\]
\[
= \frac{180}{2.25}
\]
\[
= 80 \text{ km/h}
\]

(Total 3 marks)

3. Joe travelled 60 miles in 1 hour 30 minutes.

Work out Joe’s average speed.

Give your answer in miles per hour.

\[
\text{Speed} = \frac{\text{distance}}{\text{time}}
\]
\[
= \frac{60}{1.5}
\]
\[
= 40 \text{ miles per hour}
\]

(Total 2 marks)
4. The distance from Liverpool to Prague is 1200 km. A flight from Liverpool to Prague lasts 4 hours. Work out the average speed of the aeroplane.

\[ \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{1200}{4} \]

\[ 300 \text{ km/h} \] (Total 2 marks)

5. Mia drove a distance of 343 km. She took 3 hours 30 minutes. Work out her average speed. Give your answer in km/h.

\[ \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{343}{3.5} \]

\[ 98 \text{ km/h} \] (Total 3 marks)

6. The distance from London to New York is 3456 miles. A plane takes 8 hours to fly from London to New York. Work out the average speed of the plane.

\[ \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{3456}{8} \]

\[ 432 \text{ miles per hour} \] (Total 2 marks)
7. A car travels for 3 hours. Its average speed is 75 km/h.

Work out the total distance the car travels.

\[
\text{speed} = \frac{\text{distance}}{\text{time}}
\]

\[
\text{distance} = \text{speed} \times \text{time}
\]

\[
= 75 \times 3
\]

\[
= 225
\]

\[
\text{225 km}
\]

(Total 2 marks)

8. Daniel leaves his house at 07 00.

He drives 87 miles to work. He drives at an average speed of 36 miles per hour.

At what time does Daniel arrive at work?

\[
\text{speed} = \frac{\text{distance}}{\text{time}}
\]

\[
\text{time} = \frac{\text{distance}}{\text{speed}}
\]

\[
= \frac{87}{36}
\]

\[
= \frac{29}{12} \text{ hours (2 hours 25 mins)}
\]

\[
\text{09.25}
\]

(Total 3 marks)

(a) Work out Fred's average speed.
Write down all the figures on your calculator display.

\[
\text{Speed} = \frac{\text{distance}}{\text{time}} = \frac{200}{21.2}
\]

\[9.43962264\] metres per second

(b) Round off your answer to part (a) to an appropriate degree of accuracy.

\[9.43\] (3 sf)

\[9.43\] metres per second

(Total 3 marks)

10. A plane flies 1400 kilometres in 2 hours 20 minutes.

Calculate the average speed, in km/h, of the plane.

\[
\text{Speed} = \frac{\text{distance}}{\text{time}} = \frac{1400}{2\frac{1}{3}}
\]

\[600\] km/h

(Total 3 marks)
11. 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.

\[
\text{John speed} = \frac{\text{distance}}{\text{time}} = \frac{30}{1.5} = 20 \text{ km/h}
\]

\[
\text{Kamala speed} = \frac{\text{distance}}{\text{time}} = \frac{42}{2} = 21 \text{ km/h}
\]

\[
\text{Kamala}
\]

(Total 3 marks)

12. The mass of 5 m\(^3\) of copper is 44 800 kg.

(a) Work out the density of copper.

\[
\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{44800}{5} = 8960 \text{ kg/m}^3
\]

\[
8960 \text{ kg/m}^3
\]

(2)
The density of zinc is 7130 kg/m³.

(b) Work out the mass of 5 m³ of zinc.

\[
density = \frac{mass}{volume}
\]

\[
mass = density \times volume
\]

\[
= 7130 \times 5
\]

\[
35650 \text{ kg}
\]

(Total 4 marks)

13. A silver chain has a volume of 5 cm³.
The density of silver is 10.5 grams per cm³.

Work out the mass of the silver chain.

\[
density = \frac{mass}{volume}
\]

\[
mass = density \times volume
\]

\[
= 10.5 \times 5
\]

\[
= 52.5\text{ g}
\]

(Total 2 marks)
14. The density of concrete is 2.3 grams per cm$^3$.

(a) Work out the mass of a piece of concrete with a volume of 20 cm$^3$.

$$
\text{mass} = \text{density} \times \text{volume} \\
= 2.3 \times 20 \\
= 46 \text{ grams}
$$

480 grams of a cheese has a volume of 400 cm$^3$.

(b) Work out the density of the cheese.

$$
\text{density} = \frac{\text{mass}}{\text{volume}} \\
= \frac{480}{400} \\
= 1.2 \text{ grams per cm}^3
$$

(Total 4 marks)

15. The volume of a gold bar is 100 cm$^3$.

The density of gold is 19.3 grams per cm$^3$.

Work out the mass of the gold bar.

$$
\text{mass} = \text{density} \times \text{volume} \\
= 19.3 \times 100 \\
= 1930 \text{ grams}
$$

(Total 2 marks)