Free-Standing Mathematics Qualification
Higher Level
June 2014

Algebra and Graphs 4988/PM

Unit 8

Preliminary Material

Data Sheet

To be opened and issued to candidates between Tuesday 22 April 2014 and Tuesday 6 May 2014

REMINDER TO CANDIDATES

YOU MUST **NOT** BRING THIS DATA SHEET WITH YOU WHEN YOU SIT THE EXAMINATION. A CLEAN COPY WILL BE MADE AVAILABLE.

Household water bills

Mr Smith does not have a water meter in his house.

The water company tells him that his annual bill for 2014 is £357 .

The water company informs him that a water meter can be fitted free of charge.

The water company estimates that, based on details he provided, he will use approximately 80 cubic metres of water and his bill would be reduced to £240 if he had a meter.

This £240 is worked out by adding the cost of the water used to a fixed charge. Each cubic metre of water is charged at a set rate.

This means that having a water meter would save Mr Smith £117 in 2014.

(1 cubic metre = 1000 litres.)

Carbon dioxide emissions

The table below shows the carbon dioxide emissions, in tonnes, produced by different countries in 2009.

Country	Carbon dioxide emissions (tonnes)
China	7.711×10^9
United Kingdom	5.199×10^8
United States of America	5.425×10^9

Camping at Glastonbury

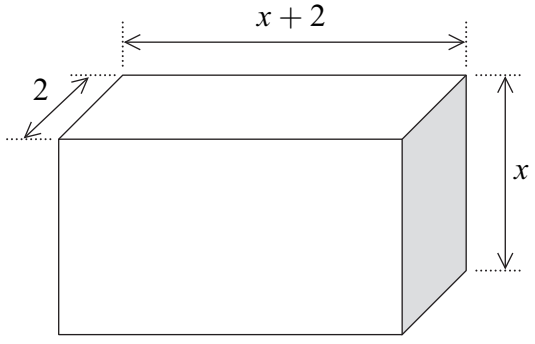
A group of students decides to go to the Glastonbury music festival.

The students need to buy some tents to use at the festival.

They could buy 3 large tents and 5 small tents for £785 .

Jewellery boxes

A manufacturer makes jewellery boxes.
One of the boxes is shown below.
All measurements are in centimetres.



Not drawn to scale

Speed cameras

Cameras can be used to record the speed of a car.

Camera A is on a motorway at the end of a 50 miles per hour speed limit. Camera B is further along the motorway.

When a car accelerates at a constant rate between these two cameras, four equations connecting acceleration, speed, distance and time can be used. These equations are:

$$v = u + at$$

$$v^2 = u^2 + 2as$$

$$s = \frac{1}{2}(u + v)t$$

$$s = ut + \frac{1}{2}at^2$$

where

a is the acceleration of the car
u is the speed of the car as it passes the first camera
v is the speed of the car as it passes the second camera
s is the distance between the two cameras
and t is the time taken to travel between the two cameras.

END OF DATA SHEET

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Camping at Glastonbury: © Getty Images

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