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# FSMQ

# ALGEBRA AND GRAPHS

## Level 2

June 2016

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## Preliminary Material

## Data Sheet

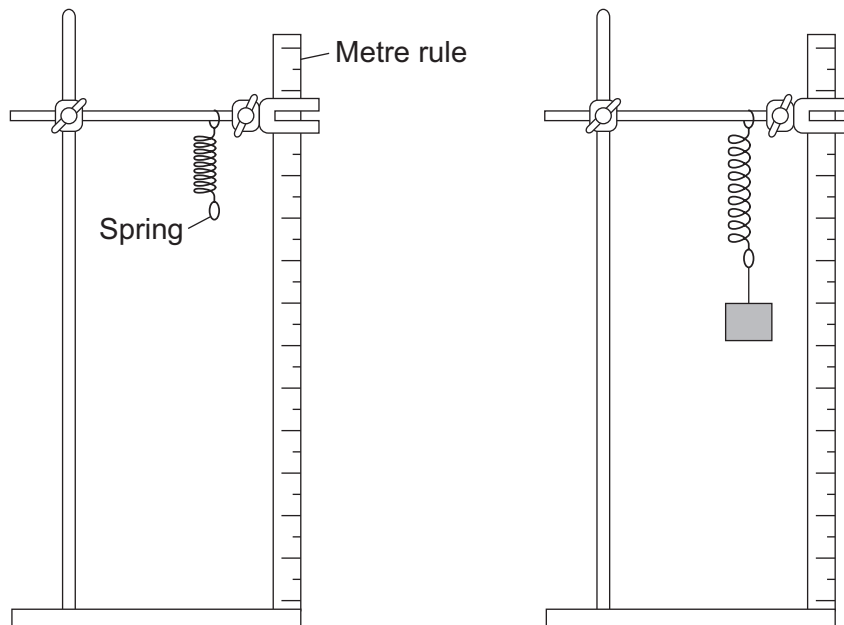
To be opened and issued to candidates between  
Tuesday 26 April 2016 and Tuesday 10 May 2016

### REMINDER TO CANDIDATES

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A CLEAN COPY WILL BE MADE AVAILABLE.

### INFORMATION

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**Physics experiment**


Sandie is a student.

She performs an experiment in which she hangs different weights on the end of a spring which is hanging vertically.

She measures the length of the spring for each weight, and completes the table below.

<b>Weight (<math>m</math> kg)</b>					
<b>Length (<math>L</math> cm)</b>					

Sandie thinks that there might be a linear relationship between the weight and the length.

**CO<sub>2</sub> emissions**

The table below shows data on the carbon dioxide emissions of some countries in 2010

Country	Population	Total CO <sub>2</sub> emissions (tonnes)	CO <sub>2</sub> emissions per capita (tonnes)
Afghanistan	28 398 000	8 236 000	0.290
Belgium	10 920 000	108 947 000	9.98

**Printer cartridges**

Jacob buys printer cartridges for a school.

The cost of a colour cartridge is not the same as the cost of a black cartridge.

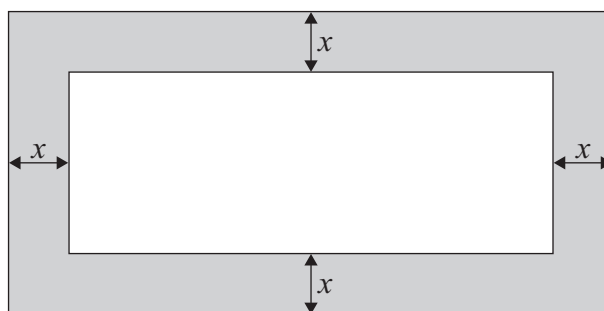
**Birthday cake**

Monica is a cake-maker.

She wants to make a rectangular cake which has a border around it.

The border will be topped with blue icing.

The diagram shows the cake as seen from above.



The width of the border is  $x$  centimetres.

Monica only has enough blue icing to cover 300 square centimetres of cake.

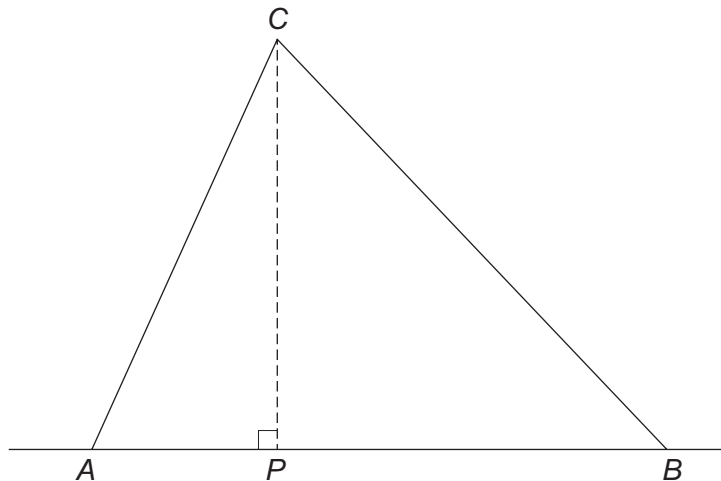
She decides to calculate the value of  $x$  which will make the total area of the border equal to 300 cm<sup>2</sup>

Turn over ►

**Landscape gardener**

Steve is a landscape gardener.  
In his work he has to measure distances and right angles accurately.

Steve has always used a very long tape measure for this work, but this is heavy and awkward to use. He buys a laser distance measurer, but he is not sure how he can use it to measure right angles.



Steve asks the advice of his friend Rachel, who is a maths teacher.  
Rachel says that, if Steve knows the distance between two points  $A$  and  $B$  on a line, and he also knows the distance from a point  $C$  to each of the points  $A$  and  $B$ , he will be able to work out the position of the point  $P$  such that angle  $APC$  is a right angle.

**School trip**

A group of children travel on two coaches on a school trip.  
Both coaches stop at a cafe for a break.  
One coach leaves and drives along a main road.  
The other coach leaves 80 seconds later.  
The first coach waits by the side of the road in a layby until the other coach catches up.  
A speed/time graph can be used for each coach to show its speed at a particular time.

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