Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Unit 2: Number, Algebra, Geometry 1 (Non-Calculator)

Higher Tier

Friday 7 November 2014 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB2H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

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 must not be used.**

Information

- The total mark for this paper is 60
- 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.

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.

Turn over ▶

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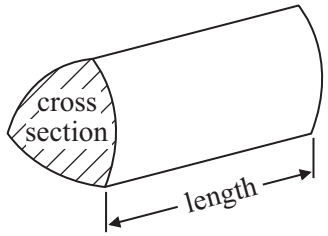
PEARSON

GCSE Mathematics 2MB01

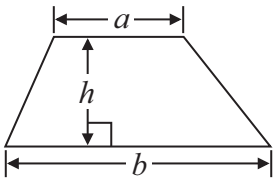
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

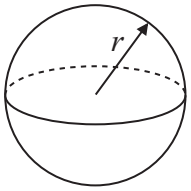


Area of trapezium = $\frac{1}{2}(a + b)h$



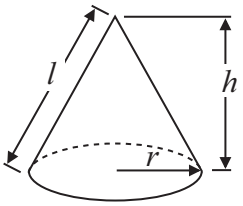
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

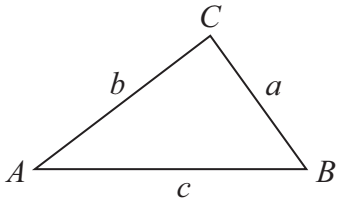


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1 Here are the first five terms of an arithmetic sequence.

5 12 19 26 33

(a) Write down an expression, in terms of n, for the nth term of the sequence.

.....

(2)

The expression $4n^2 - 5$ is the nth term of a different sequence.

(b) Find the 3rd term of this sequence.

.....

(2)

(Total for Question 1 is 4 marks)

2 A pattern is made using four identical rectangular tiles.

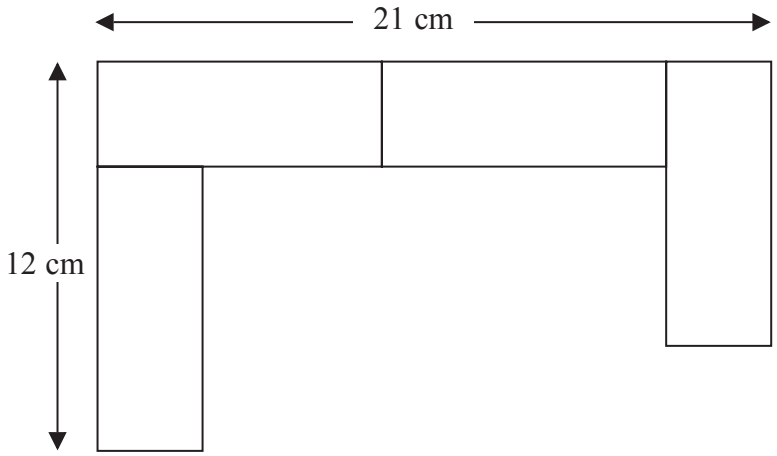


Diagram **NOT** accurately drawn

Find the total area of the pattern.

..... cm^2

(Total for Question 2 is 5 marks)

3 Here are the ingredients needed to make 20 cookies.

Cookies

Ingredients to make **20** cookies.

250 g butter
120 g caster sugar
300 g flour

Sam is going to make some cookies.

She has these ingredients.

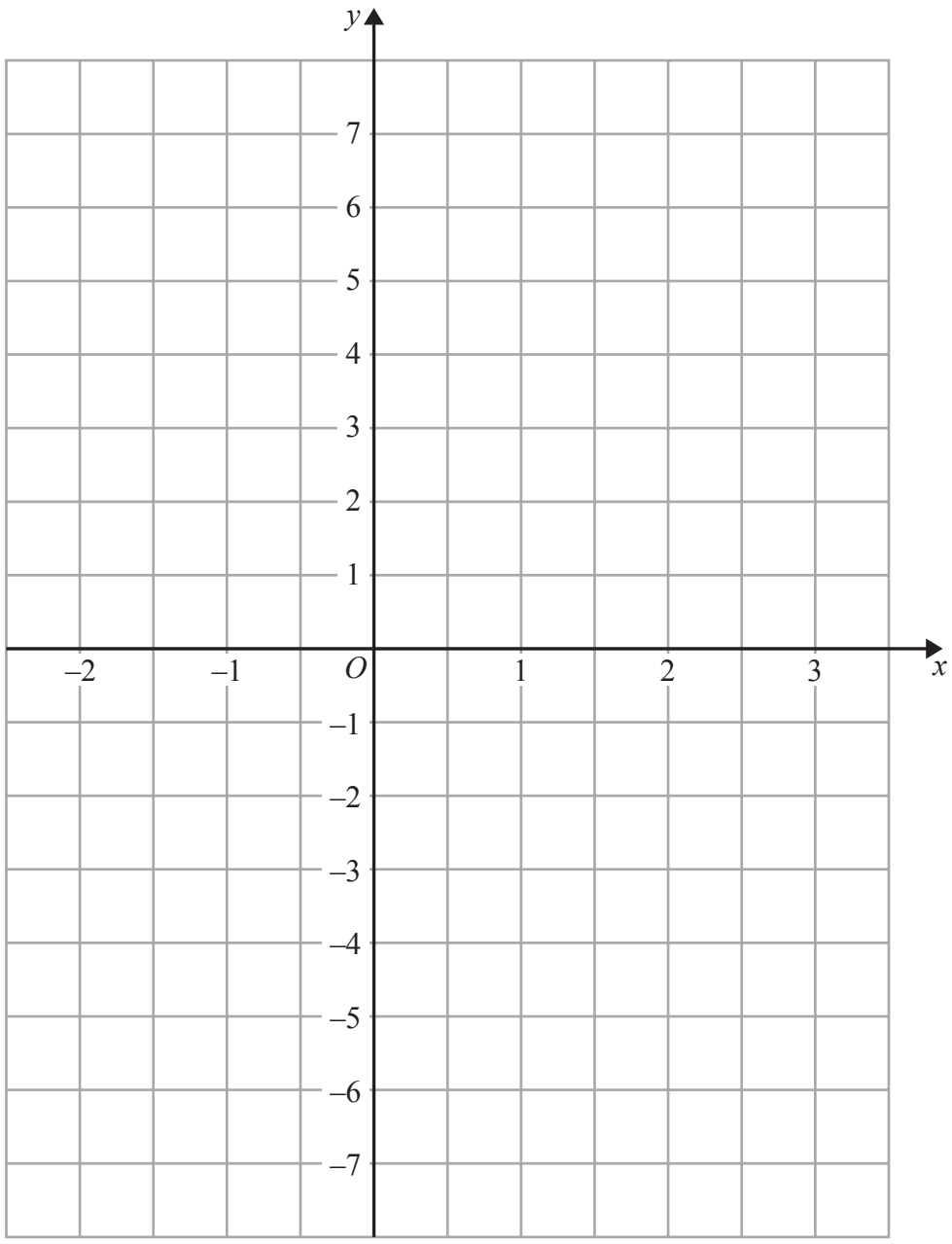
625 g butter 360 g caster sugar 1000 g flour

Work out the greatest number of cookies that Sam can make with her ingredients.
You must show your working.

.....

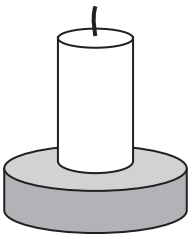
(Total for Question 3 is 3 marks)

4 On the grid, draw the graph of $y = 2x - 3$ for values of x from -2 to 3



(Total for Question 4 is 3 marks)

5 Caroline is making some table decorations.
Each decoration is made from a candle and a holder.



candle and holder

Caroline buys some candles and some holders each in packs.

There are 30 candles in a pack of candles.
There are 18 holders in a pack of holders.

Caroline buys exactly the same number of candles and holders.

(i) How many packs of candles and how many packs of holders does Caroline buy?

..... packs of candles

..... packs of holders

Caroline uses all her candles and all her holders.

(ii) How many table decorations does Caroline make?

..... table decorations

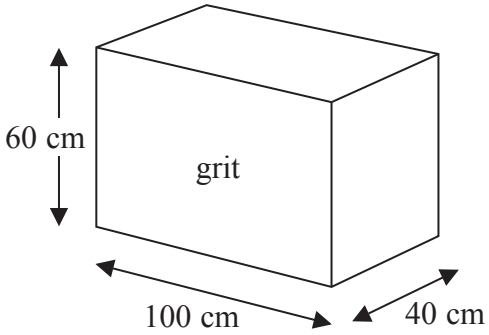
(Total for Question 5 is 5 marks)

***6** The diagram shows a box for winter grit.
The box is in the shape of a cuboid.
The box is empty.

Jon wants to fill the box with grit.
A bag of grit costs £2.50
There are 8000 cm^3 of grit in a bag.

Jon has £70 to spend on the grit.

Diagram **NOT** accurately drawn



Does Jon have enough money to buy all the grit he needs to fill the box completely?

(Total for Question 6 is 5 marks)

*7 The world speed record for a train is 360 mph.
It takes Malcolm 6 seconds to drive a train 1 kilometre.

Has the train broken the world speed record?
Use 5 miles = 8 km.

(Total for Question 7 is 5 marks)

8 Work out $3\frac{1}{3} \times 4\frac{2}{5}$

Give your answer as a mixed number in its simplest form.

.....

(Total for Question 8 is 3 marks)

9 AB is a line segment.

A is the point (3, 6, 7)
The midpoint of the line AB has coordinates (0, –3, 3)

Find the coordinates of point B.

(..... , ... , ...)

(Total for Question 9 is 2 marks)

10 (a) Write down the value of 7^0

.....

(1)

(b) Write down the value of 2^{-4}

.....

(1)

(c) Rationalise the denominator of $\frac{14}{\sqrt{7}}$

Give your answer in its simplest form.

.....

(2)

(Total for Question 10 is 4 marks)

11 (a) Simplify $2x^3y^5 \times 3x^2y^3$

.....

(2)

(b) Expand and simplify $(2x - 3)(3x - 1)$

.....

(2)

(c) Factorise completely $8x^3y^5 - 12x^4y^2$

.....

(2)

(d) Factorise $2e - 4f + ex - 2fx$

.....

(2)

(Total for Question 11 is 8 marks)

12

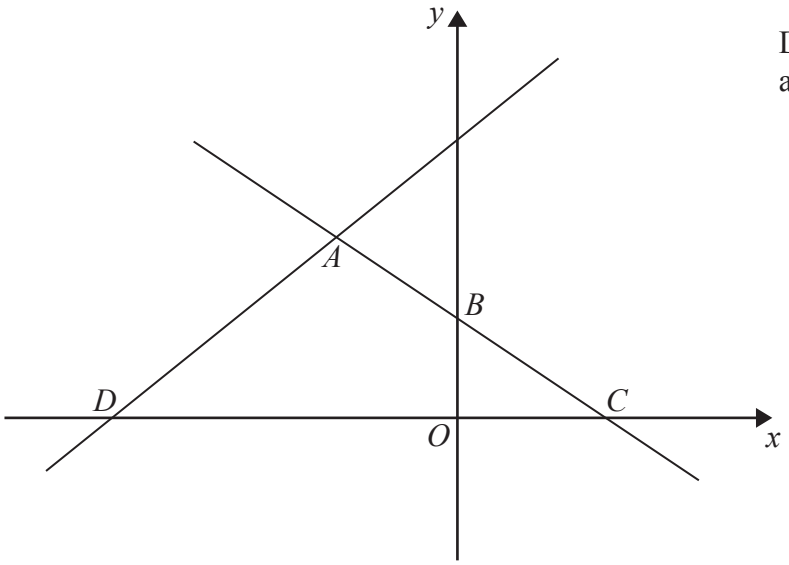


Diagram **NOT** accurately drawn

In the diagram, ABC is the line with equation $y = -\frac{1}{2}x + 5$

$AB = BC$
D is the point with coordinates $(-13, 0)$

Find an equation of the line through A and D.

(Total for Question 12 is 5 marks)

13 Simplify fully $\dfrac{4}{2-x} - \dfrac{3}{x}$

.....

(Total for Question 13 is 3 marks)

***14**

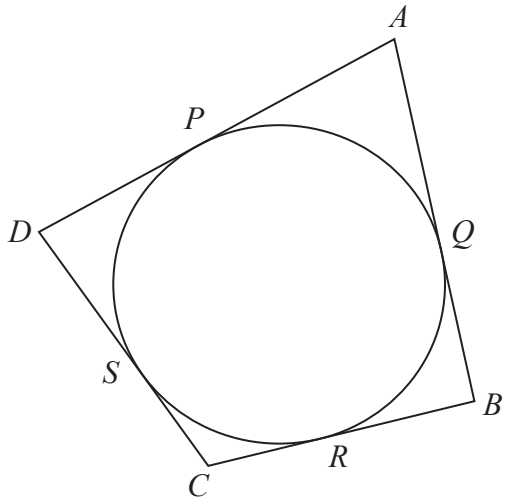


Diagram **NOT** accurately drawn

ABCD is a quadrilateral.
AB, *AD*, *BC* and *CD* are tangents to a circle.
The tangents touch the circle at *Q*, *P*, *R* and *S* respectively.
AC goes through the centre of the circle.

AP : *PD* is in the ratio 3 : 2
AQ : *QB* is in the ratio 3 : 2

Prove that *ABCD* is a kite.

(Total for Question 14 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS

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