Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Mathematics A
Paper 1 (Non-Calculator)

Higher Tier

Sample Assessment Material
Time: 1 hour 45 minutes

Paper Reference
1MA0/1H

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 100.
- 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.

Turn over

S37709A
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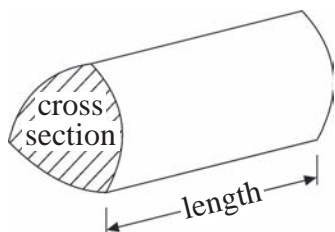2/2/2/2/3/3/2/2/

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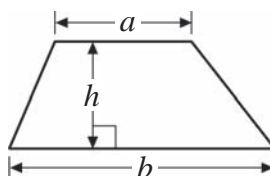
GCSE Mathematics 1MA0

Formulae – Higher Tier

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

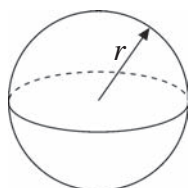**Volume of a prism** = area of cross section × length

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 $= \pi r l$
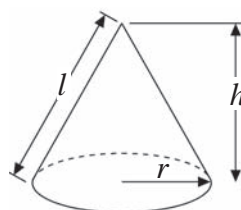
In any triangle _ABC_

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 $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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.
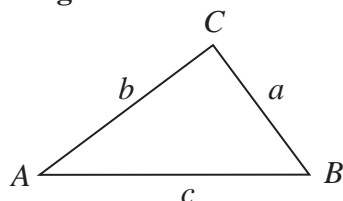
You must write down all stages in your working.

1 (i) Simplify $13x - 24y + 17x + 14y$

....

(ii) Solve $6(1 - 2x) - 3(x + 1) = 0$

....

(Total for Question 1 = 5 marks)

*2 Jennie's council has a target of $\frac{1}{5}$ for households to recycle their waste.

In January, Jennie recycled $\frac{1}{10}$ of her household waste.

In February, she recycled 15 kg of her 120 kg of household waste.

Her result for March was 13 % recycled out of 112 kg of household waste.

Has Jennie met the council's target?
Which was her best month for recycling?
Show clearly how you got your answers.

(Total for Question 2 = 4 marks)

3

8 m

4 m

8 m

Diagram **NOT** accurately drawn

6 m
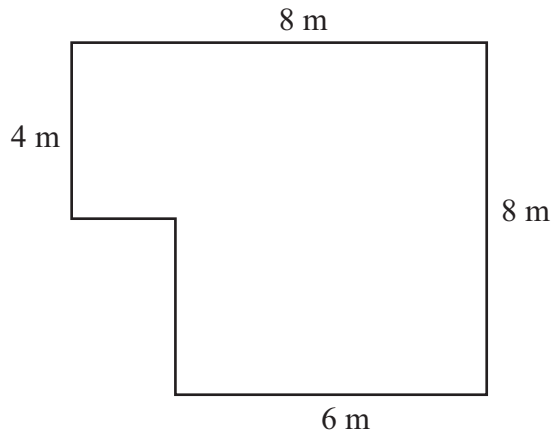
The diagram is a plan of the floor of Nikola's room.
All the angles are right angles.
Nikola is going to lay carpet tiles to cover all the floor.
Each tile is a square 50 cm by 50 cm.
Each tile costs £4

Work out the total cost of the carpet tiles needed to cover all the floor.

£ ....

(Total for Question 3 = 6 marks)

4 (a) Solve $5p - 16 = 4$

(2)

$p = $ ....

(b) Solve $2q - 4 = 5q + 5$

(2)

$q = $ ....

$y = 3(2x - 1) - 2(5 + 3x)$

(c) Show that y will always be the same value.

(2)

(Total for Question 4 = 6 marks)

5 The *n*th term of a sequence is $2n^2$

(i) Find the 4th term of the sequence.

....

(ii) Is the number 400 a term of the sequence?

....

Give reasons for your answer.

(Total for Question 5 = 3 marks)

6 Last year Sasha was paid £15400 after deductions from her gross salary.
She was paid 70% of her gross salary.
This year Sasha's gross salary increased by 2%.

Work out the increase in Sasha's gross salary. Give your answer in pounds.

£ ....

(Total for Question 6 = 4 marks)

7 (a) Express 66 as a product of its prime factors.

(2)

....

(b) Express 132^2 as a product of its prime factors.

(2)

....

(Total for Question 7 = 4 marks)

8 A bag contains only red, yellow and blue discs.

The probability of drawing a red disc at random is $\dfrac{1}{2}$

The probability of drawing a yellow disc at random is x
The probability of drawing a blue disc at random is $4x$

One disc is to be selected at random.

Work out the probability that it will be a blue disc.
Give your answer as a numerical value.

....

(Total for Question 8 = 3 marks)

9 (a) Simplify

(i) $a^5 \div a^3$

(3)

....

(ii) $2x^2 \times 3x^2y^2$

....

(b) Expand and simplify $(x + 3)(x + 7)$

(2)

....

(c) Factorise fully $3pq - 12p^2$

(2)

....

(d) (i) Factorise $3y^2 - 10y + 3$

(4)

....

Hence, or otherwise

(ii) Factorise $3(x+2)^2 - 10(x+2) + 3$

....

(Total for Question 9 = 11 marks)

10

| 1 | 2 | 3 | - - - - - - - | 98 | 99 | 100 |

The diagram represents 100 cards. Each card has a whole number from 1 to 100 on it.
No cards have the same number.

Bill puts a red dot on every card which has a multiple of 6 on it.
Parul puts a green dot on every card which has a multiple of 9 on it.

All the cards are placed in a bag.
Vicki selects a card is selected at random.

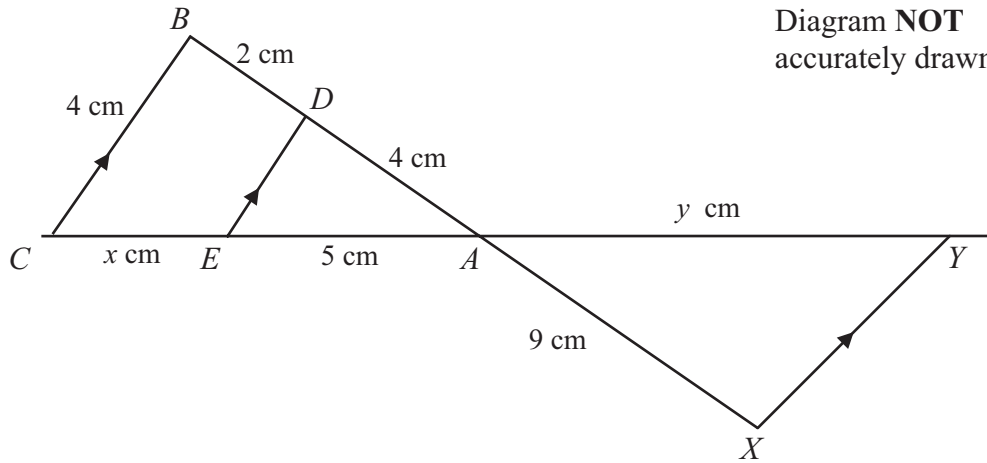What is the probability that the card has both a red and a green dot on it?

....

(Total for Question 10 = 3 marks)

11

CEAY and *BDAX* are straight lines.
XY, ED and *CB* are parallel.
AE = 5 cm.
AX = 9 cm.
AD = 4 cm.
BC = 4 cm.
BD = 2 cm.

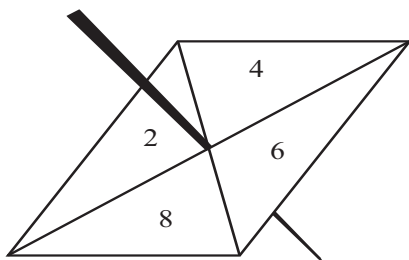*CE* = *x* cm.
XY = *y* cm.

Find the value of *x* and the value of *y*.

x = ...

y = ...

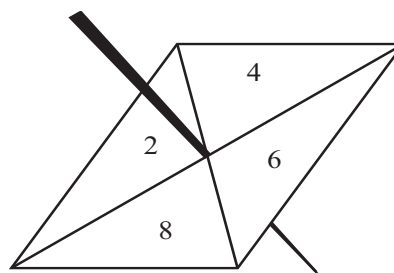**(Total for Question 11 = 4 marks)**

12 Here are two fair 4-sided spinners.
One is a Blue spinner and one is a Red spinner.

Blue spinner   **Red spinner**

Each spinner has four sections numbered 2, 4, 6 and 8

Each spinner is to be spun once.

Total score = Blue spinner score + Red spinner score

(a) Find the probability that the total score will be 10

(3)

....

Ali and Shazia play a game.

In each round of the game, Ali spins the Blue spinner once and Shazia spins the Red spinner once.

Ali wins when the Blue spinner score is greater than the Red spinner score.

Ali and Shazia play 80 rounds.

(b) Work out an estimate of the number of rounds that Ali will win.

(3)

....

(Total for Question 12 = 6 marks)

13 The population of Algeria is 34 million.

(a) Write 34 million in standard form.

(1)

....

The total land area of Algeria is 2.4×10^{12} m².
5% of the total land area is used to grow crops.

(b) Work out the area of land in Algeria which is used to grow crops.
Write your answer in standard form, in km².

(2)

.... m²

(Total for Question 13 = 3 marks)
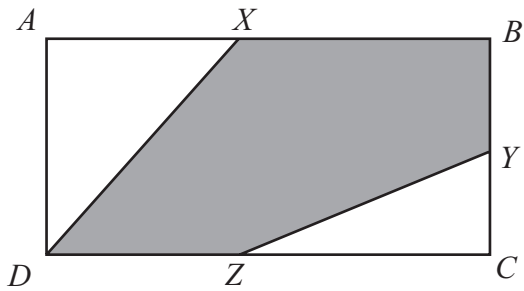
14

Diagram **NOT** accurately drawn

ABCD is a rectangle.
X is the midpoint of *AB*.
Y is the midpoint of *BC*.
Z is the midpoint of *CD*.

What fraction of the total area of *ABCD* is shaded?

Show clearly how you get your answer.

....

(Total for Question 14 = 4 marks)

15

Diagram **NOT**
accurately drawn

In the diagram,

$\overrightarrow{OA}$ = 4**a**   and $\overrightarrow{OB}$ = 4**b**

OAC, OBX and *BQC* are all straight lines

AC = 2*OA* and *BQ*: *QC* = 1:3

(a) Find, in terms of **a** and **b**, the vectors which represent

(4)

 (i) $\overrightarrow{BC}$

....

 (ii) $\overrightarrow{AQ}$

....

Given that $\overrightarrow{BX}$ = 8**b**

(b) Show that *AQX* is a straight line.

(3)

(Total for Question 15 = 7 marks)

16 There are 10 students in a class.
6 of the students are boys and 4 of the students are girls.

Three students are picked at random from the class to form a team.

Work out the probability that the team consists of 1 girl and 2 boys.

....

(Total for Question 16 = 4 marks)

17 Simplify $\dfrac{3x^2 - 16x - 35}{9x^2 - 25}$

....

(Total for Question 17 = 3 marks)

18 $\sqrt{3} = 3^k$

(a) Write down the value of k

(1)

....

(b) Expand and simplify $(2 + \sqrt{3})(1 + \sqrt{3})$

Give your answer in the form $a + b\sqrt{3}$

where a and b are integers

(2)

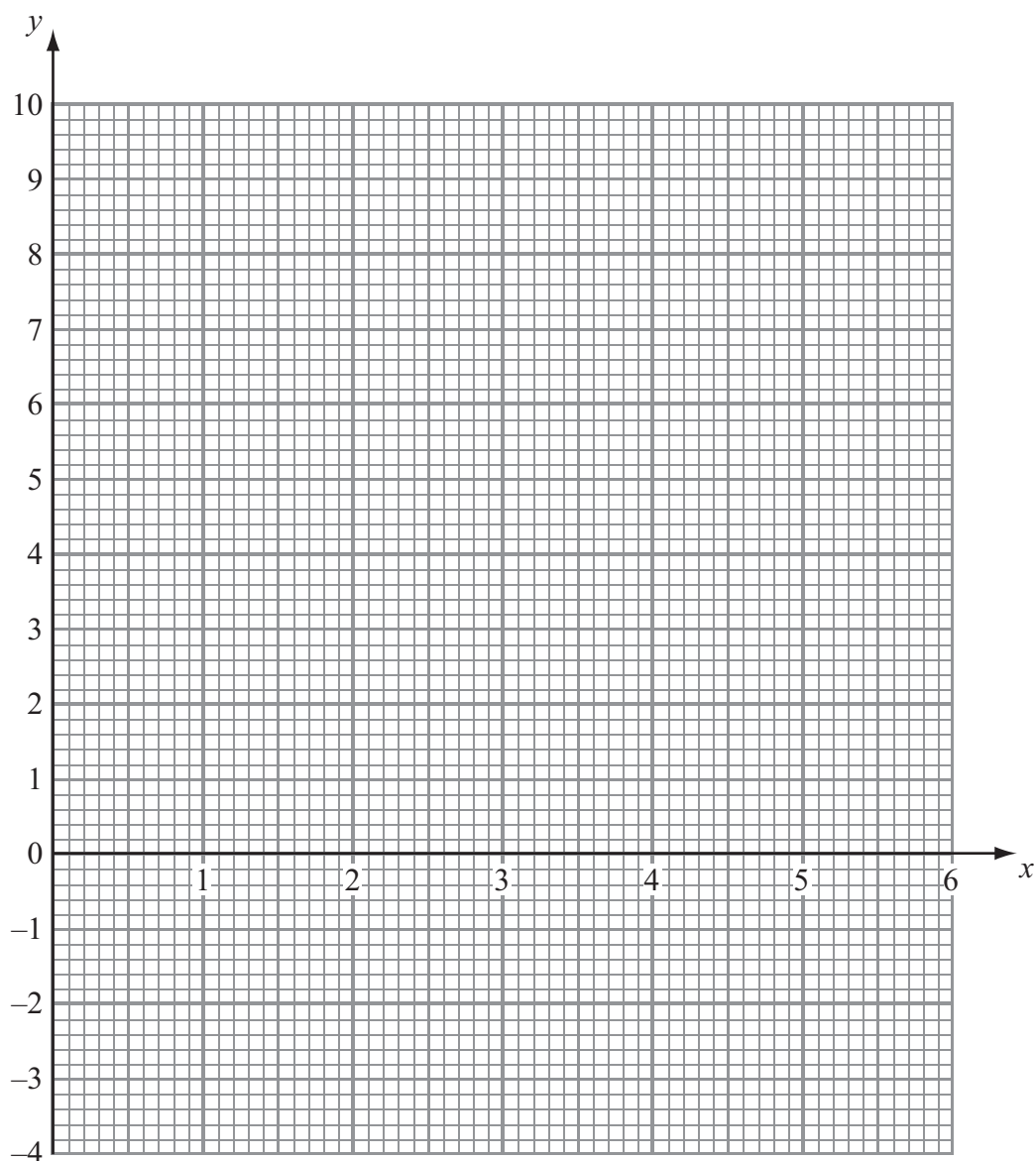...

(Total for Question 18 = 3 marks)

19 (a) On the grid draw the graph of $y = x(x-3)$

(2)

(b) Using your result for (a), or otherwise,
    solve the simultaneous equations

$$y = x(x - 3)$$

$$x^2 + y^2 = 9$$

<div align="right">(3)</div>

<div align="right">**(Total for Question 19 = 5 marks)**</div>

*20 Prove that the difference between the squares of consecutive odd numbers is a multiple of 8

(Total for Question 20 = 6 marks)

Sample Assessment Materials

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21 Mr Walton is responsible for maintaining fish stocks in a river. The table gives some information about the lengths, in centimetres, of a type of fish caught from the river.

Length (L) cm	Frequency
$0 < L \leqslant 10$	40
$10 < L \leqslant 20$	60
$20 < L \leqslant 40$	90
$40 < L \leqslant 80$	60
$L > 80$	0

He wants to study the effect of returning to the river fish less than 50 cm in length that are caught.

Mr Walton suggests that fish which are less than 50 cm in length are returned to the river.

Draw a suitable statistical diagram for the information in the table.

Use it to find an estimate of the percentage of fish returned to the river.

.... %
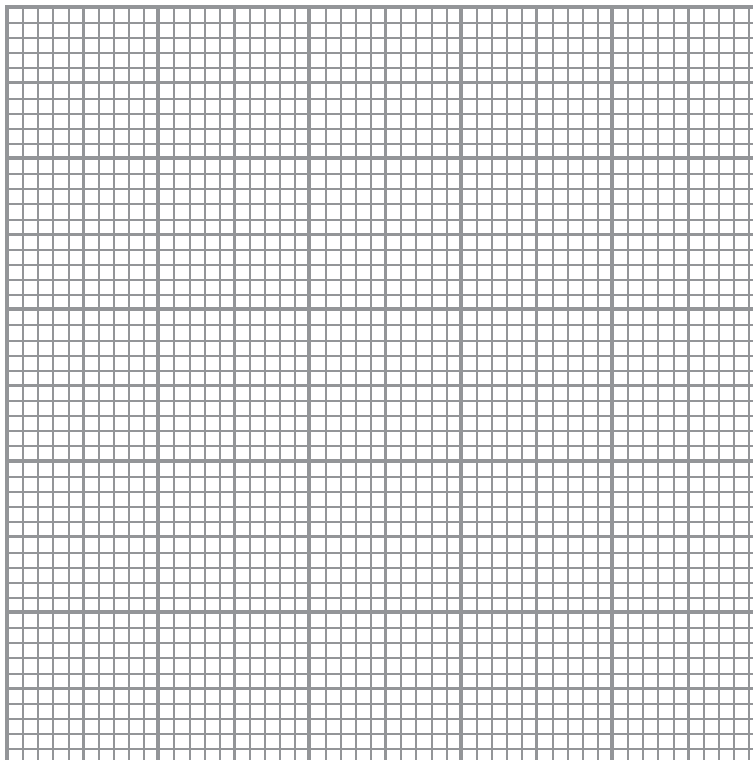
(Total for Question 21 = 6 marks)

TOTAL FOR PAPER = 100 MARKS