Write your name here

Surname	Other names

Centre Number | Candidate Number

Edexcel GCSE

Mathematics A

Paper 2 (Calculator)

Practice Papers Set D

Higher Tier – A*

Time: 1 hour 45 minutes	Paper Reference 1380 / 2381

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.

Advice

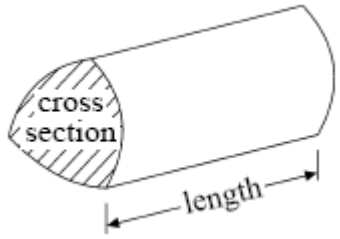
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics (Linear) 1MA0

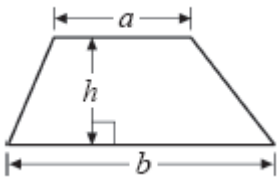
Formulae: Higher Tier

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

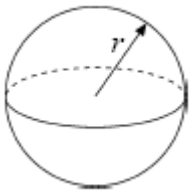
Volume of prism = area of cross section × length



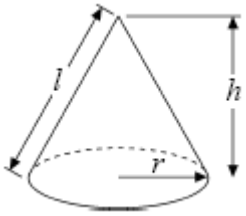
Area of trapezium = $\frac{1}{2}(a + b)h$



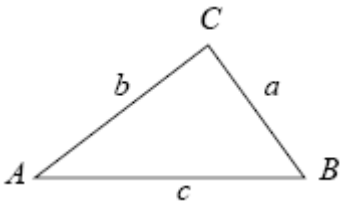
Volume of sphere $\frac{4}{3}\pi r^3$
Surface area of sphere = $4\pi r^2$



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 $ax2+ bx + c = 0$
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 TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Factorise $6y^2 - y - 12$

.....

(Total 2 marks)

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2. The diagram below shows a large rectangle of length $(2x + 6)$ cm and width x cm.

A smaller rectangle of length x cm and width 3 cm is cut out and removed.

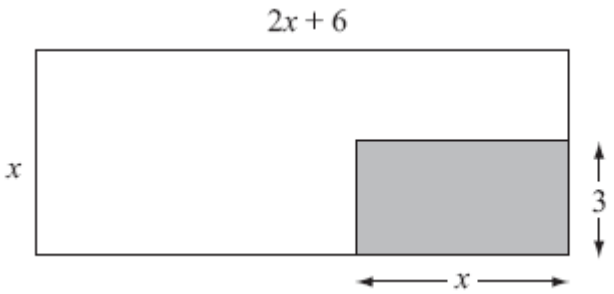


Diagram **NOT** accurately drawn

The area of the shape that is left is 100 cm^2.

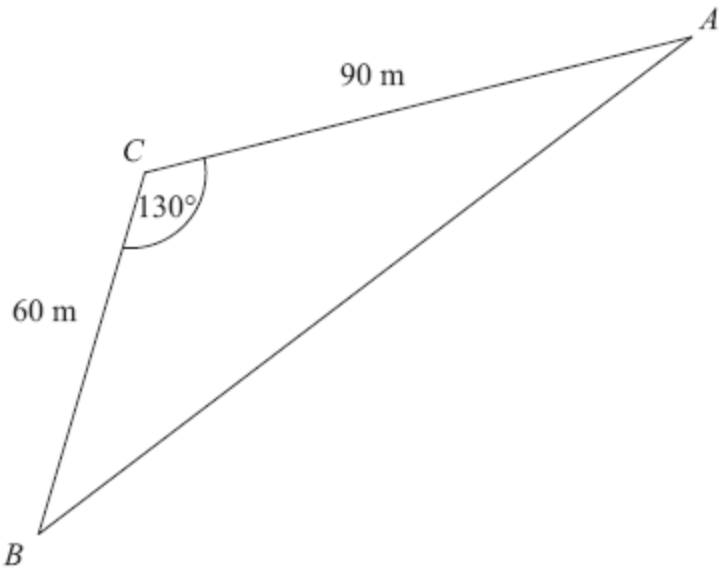
Given that $2x^2 + 3x - 100 = 0$, calculate the length of the smaller rectangle.
Give your answer correct to 3 significant figures.

..... cm

(Total 4 marks)

3. Here is a triangle *ABC*.

Diagram **NOT** accurately drawn



AC = 90 m.
BC = 60 m.
Angle *ACB* = 130°.

Calculate the perimeter of the triangle.
Give your answer correct to one decimal place.

..... m

(Total 4 marks)

4. The average fuel consumption (c) of a car, in kilometres per litre, is given by the formula

$$c = \frac{d}{f}$$

where d is the distance travelled, in kilometres, and f is the fuel used, in litres.

d = 163 correct to 3 significant figures.
f = 45.3 correct to 3 significant figures.

By considering bounds, work out the value of c to a suitable degree of accuracy.
You must show **all** of your working **and** give a reason for your final answer.

c = ...

(Total 5 marks)

5.

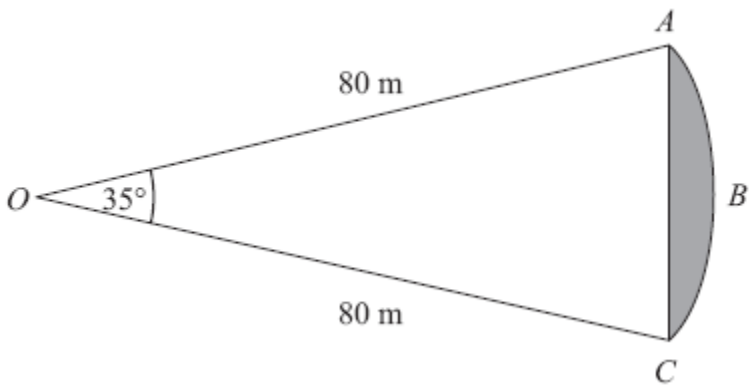


Diagram **NOT** accurately drawn

ABC is an arc of a circle centre *O* with radius 80 m.
AC is a chord of the circle.
Angle *AOC* = 35°.

Calculate the area of the shaded region.
Give your answer correct to 3 significant figures.

..... m^2

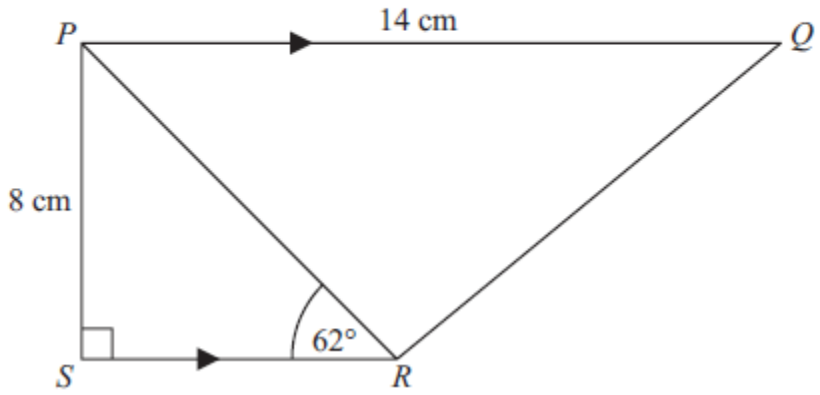
(Total 5 marks)

6. Solve $\frac{4}{x+3} + \frac{3}{2x-1} = 1$

(Total for Question 1 is 5 marks)

7.

Diagram **NOT** accurately drawn



PQRS is a trapezium.
PQ is parallel to *SR*.
Angle *PSR* = 90°.
Angle *PRS* = 62°.
PQ = 14 cm.
PS = 8 cm.

Work out the length of *QR*.
Give your answer correct to 3 significant figures.

..... cm

(Total 4 marks)

8. Steve measured the length and the width of a rectangle.
He measured the length to be 645 mm correct to the nearest 5 mm.
He measured the width to be 400 mm correct to the nearest 5 mm.

Calculate the lower bound for the area of this rectangle.
Give your answer correct to 3 significant figures.

..... mm^2

(Total 3 marks)

9.

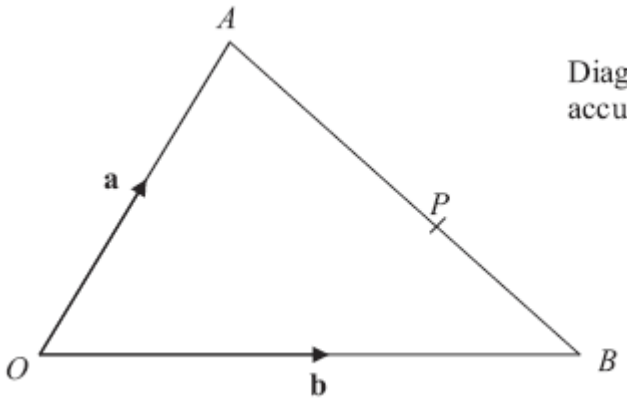


Diagram **NOT** accurately drawn

OAB is a triangle.

$\overrightarrow{OA}$ = **a**

$\overrightarrow{OB}$ = **b**

P is the point on *AB* such that *AP* : *PB* = 3 : 2

Show that $\overrightarrow{OP} = \frac{1}{5}(2\mathbf{a} + 3\mathbf{b})$

(Total 3 marks)

10. $v = \sqrt{\frac{a}{b}}$

a = 6.43 correct to 2 decimal places.
b = 5.514 correct to 3 decimal places.

By considering bounds, work out the value of v to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

v = ...

(Total 5 marks)

11.

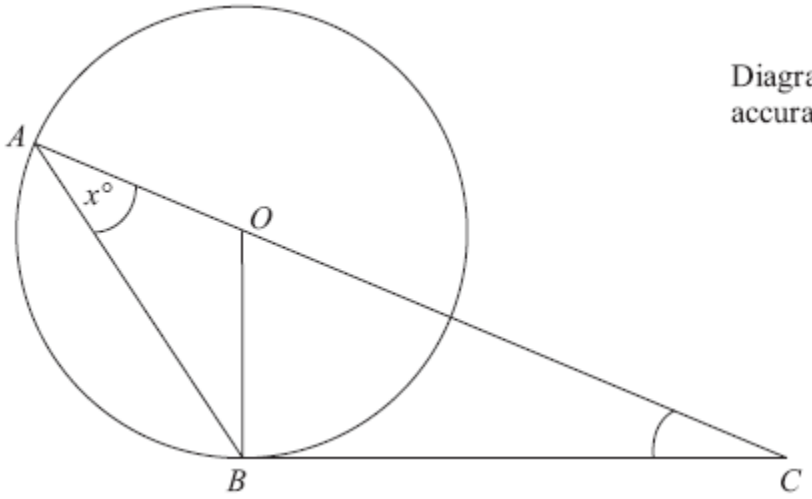


Diagram **NOT** accurately drawn

A and *B* are points on a circle, centre *O*.
BC is a tangent to the circle.
AOC is a straight line.
Angle *BAO* = *x*°.

Find the size of angle *ACB*, in terms of *x*.

.....°

(Total 2 marks)

12. For all values of x, $x^2 + 6x - 2 = (x + p)^2 + q$

Find the value of p and the value of q.

p = ... q = ...

(Total 2 marks)

---

13. (a) Simplify $\dfrac{4x^2y}{6x}$

.....

(2)

(b) Simplify $\dfrac{2x^2 + 3xy + y^2}{x^2 - y^2}$

.....

(3)

(Total 7 marks)

14.

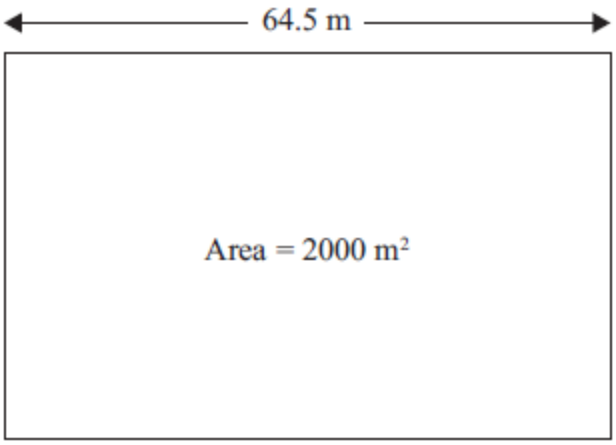


Diagram **NOT** accurately drawn

The diagram shows a rectangular field.

The area of the field is 2000 m^2, correct to 1 significant figure.
The length of the field is 64.5 m, correct to the nearest 10 cm.

Calculate the upper bound for the width of the field.
Give your answer correct to 3 significant figures.

..... m

(Total 4 marks)

15. Solve $\dfrac{5(2x+1)^2}{4x+5} = 5x - 1$

.....

(Total 5 marks)

---

16. Prove that $(3n + 1)^2 - (3n - 1)^2$ is a multiple of 4, for all positive integer values of n.

(Total 3 marks)

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17. The equation of a straight line is $y = 2x + 1$

Write down the equation of a straight line that is perpendicular to $y = 2x + 1$

.....

(Total 2 marks)

18.

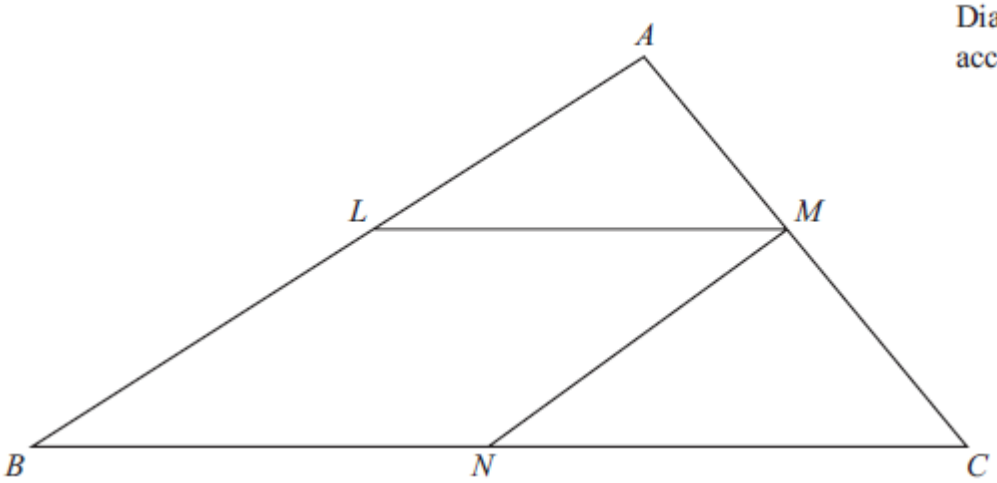

Diagram **NOT** accurately drawn

The diagram shows a triangle *ABC*.

LMNB is a parallelogram where
L is the midpoint of *AB*,
M is the midpoint of *AC*,
and *N* is the midpoint of *BC*.

Prove that triangle *ALM* and triangle *MNC* are congruent.
You must give reasons for each stage of your proof.

(Total 3 marks)

19. There are 17 girls and 14 boys in Mr. Taylor's class.

Mr. Taylor is going to choose at random 3 children from his class.

Work out the probability that he will choose exactly 2 girls and 1 boy.

.....

(Total 4 marks)

20. Make n the subject of the formula

$$a = \frac{6a - n}{3 + n}$$

n = ...

(Total 4 marks)

21.

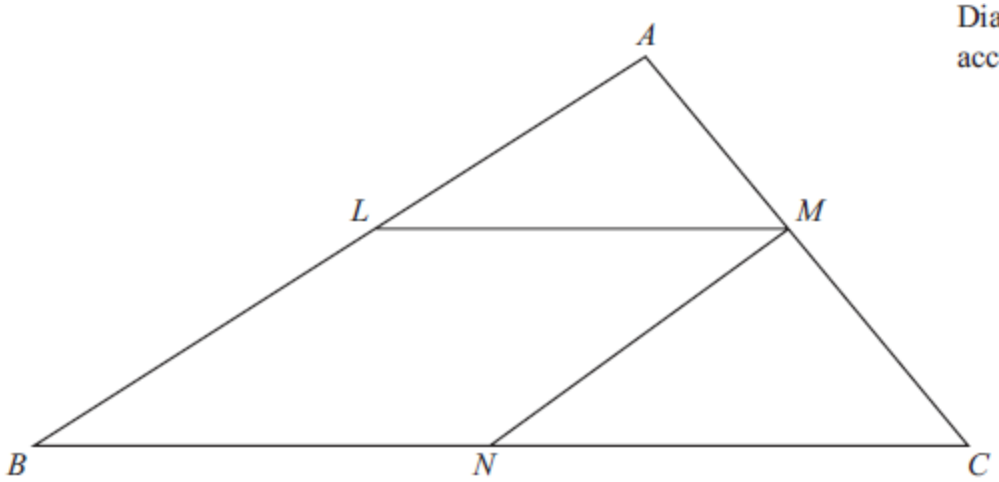

Diagram **NOT** accurately drawn

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You must give reasons for each stage of your proof.

(Total 3 marks)

22. (a) Write as a single fraction in its simplest form $\frac{2}{x-4} - \frac{1}{x+3}$

.....

(3)

(b) Write $\frac{3}{x+1} - \frac{2}{x}$ as a single fraction in its simplest form.

.....

(3)

(c) Write $\frac{2x}{2x-3} - \frac{7}{x(2x-3)}$ as a single fraction in its simplest form.

.....

(3)

(Total 9 marks)

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23. Use algebra to prove that the sum of three consecutive whole numbers is always divisible by 3.

(Total 3 marks)

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24. Explain what is meant by a random sample.

.....

.....

(Total 1 mark)

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25. **A** and **B** are two solid shapes which are mathematically similar.
The shapes are made from the same material.

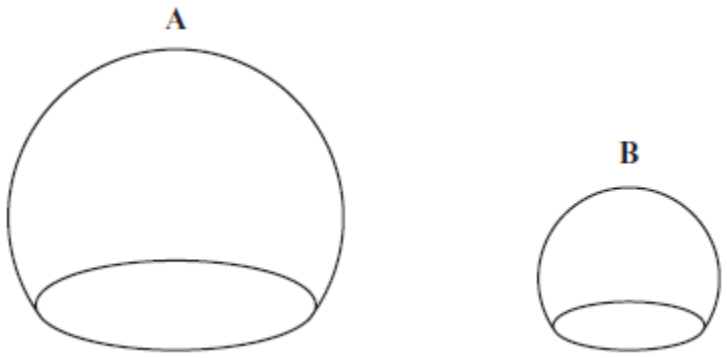

Diagram **NOT** accurately drawn

The surface area of **A** is 50 cm^2.
The surface area of **B** is 18 cm^2.

The mass of **A** is 500 grams.

Calculate the mass of **B**.

..... grams

(Total 4 marks)

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26. (a) Find the gradient of the straight line with equation $2x - 3y = 12$

.....

(2)

(b) Prove that the straight line with equation $2y = 10 - 3x$
is perpendicular to the straight line with equation $2x - 3y = 12$

(2)

(Total 4 marks)

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27 Find the exact solutions of $x + \frac{3}{x} = 7$

.....

(Total 3 marks)

TOTAL FOR PAPER IS 100 MARKS

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New Question	Qn	Paper	Skill tested	Mean score	Maximum score	Mean Percentage
1	Q07c	1203 10H	Factorise trinomials (non-unitary x^2)	0.30	2	15
2	Q15b	1106 14H	Solve quadratic equations by using the quadratic formula	0.57	4	14
3	Q20	1203 2H	Use sine, cosine and area of a triangle rules to solve a scalene triangle problem	0.55	4	14
4	Q22	1203 2H	Use bounds in calculations	0.70	5	14
5	Q23	1203 2H	Find the area of a segment	0.70	5	14
6	Q18	0911 14H	Solve fractional equations	0.63	5	13
7	Q20b	1111 2H	Use trigonometry in complex problems	0.50	4	13
8	Q25	1111 2H	Write down the lower and upper bound of a quantity given its degree of accuracy	0.39	3	13
9	Q23b	0906 4H	Use vectors to solve geometric configurations	0.35	3	12
10	Q28	0911 4H	Write down the lower and upper bound of a quantity given its degree of accuracy	0.58	5	12
11	Q09b	0911 10H	Solve geometric configurations using circle theorems of chord and tangents	0.23	2	12
12	Q25d	1011 2H	Simplify algebra (including completing the square)	0.24	2	12
13a	Q08b	1111 10H	Simplify simple algebraic fractions	0.23	2	12
13b	Q10	1111 10H	Simplify harder algebraic fractions	0.36	3	12
14	Q17	1111 14H	Use bounds in calculations	0.45	4	11
15	Q24	1203 2H	Solve fractional equations	0.54	5	11
16	Q22	0906 4H	Use algebra to perform proofs	0.31	3	10
17	Q10	1111 14H	Find the equations of straight lines perpendicular to a given line	0.19	2	10
18	Q16	1111 14H	Find the conditions in order to prove that two triangles are congruent	0.30	3	10
19	Q04	1203 6A	Solve conditional probability problems	0.40	4	10
20	Q18	1011 14H	Change the subject of the formula	0.37	4	9
21	Q22	1111 2H	Find the conditions in order to prove that two triangles are congruent	0.28	3	9
22a	Q23c	1111 2H	Simplify harder algebraic fractions	0.28	3	9
22b	Q09	1203 10H	Add and subtract algebraic fractions	0.27	3	9
22c	Q07	0911 10H	Simplify harder algebraic fractions	0.15	2	8
23	Q10	1006 10H	Algebraic Proof	0.23	3	8
24	Q24a	1006 2H	Use practical sampling	0.06	1	6
25	Q23	1006 2H	Find lengths using mathematically similar shapes	0.21	4	5
26a	Q12a	1106 14H	Find the gradient and y intercept of a straight line using x = mx+ c	0.20	2	10
26b	Q12b	1106 14H	Find the equations of straight lines perpendicular to a given line	0.09	2	5
27	Q19	1111 2H	Solve fractional equations	0.16	3	5
			TOTAL	**10.82**	**100**	