YEARLY PAST PAPERS
WITH TOPICAL QUESTIONS TRACKER

Edexcel IGCSE

Mathematics (4MA1) Paper 2F

SAMPLE EDITION
2020 QUESTION PAPERS & MARK SCHEMES

Note:

Provided for preview purposes to demonstrate format, organisation, and content quality. The full edition contains all examination years listed. For more information, visit:
Edexcel International GCSE Mathematics A (4MA1) Product Page

Introduction

Topical Questions Tracker: An Efficient Study Tool

A Topical Questions Tracker is a powerful tool, integrated as an appendix to Yearly Past Papers, enhancing the functionality of utilising Past Papers. This tool allows you to locate specific questions by topic, providing a much more efficient way to study for exams.

How the Topical Questions Tracker Works

The Topical Questions Tracker is organized according to the latest syllabus of the subject. Each topic includes a comprehensive list of all relevant questions from the yearly past papers. For each question, the tracker provides:

- The paper's code
- The question number
- The sub-question number (if applicable)
- The page number where the question is located, which is hyperlinked for easy navigation

By clicking on the linked page number, you can jump directly to the corresponding page in the document, making it quick and simple to find the exact question you're looking for.

Advantages of Topical Questions Trackers Over Traditional Past Papers

While traditional Topical Past Papers classify entire questions under a single topic, many questions contain sub-questions that may cover different topics. This can make it difficult to find specific practice material for a particular area of study.

The Topical Questions Tracker overcomes this limitation by categorizing each sub-question individually. This precise classification ensures that each part of the question is assigned to the appropriate topic, providing a more targeted and effective revision tool.

Efficient Navigation Tips

While the Topical Questions Tracker allows you to jump directly to specific questions by clicking on the linked page numbers, navigating back to the previous page to find the next question can be time-consuming and somewhat frustrating. To streamline this process, you can utilize the 'Previous View' and 'Next View' commands in Adobe Reader.

To access these commands, navigate to the menu and select View » Go to » Previous View or Next View. Alternatively, you can use the shortcut keys for quicker navigation:

- Previous View: ALT + Left Arrow
- Next View: ALT + Right Arrow

These commands enable you to seamlessly move back and forth between the last two pages visited, enhancing your study efficiency by minimizing unnecessary navigation steps.

Contents

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Wednesday 15 January 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/2F**

Mathematics A

Paper 2F

Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

P59753A

1/1/1/

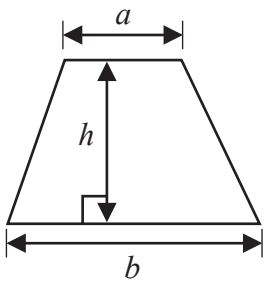
P 5 9 7 5 3 A 0 1 2 4

Pearson

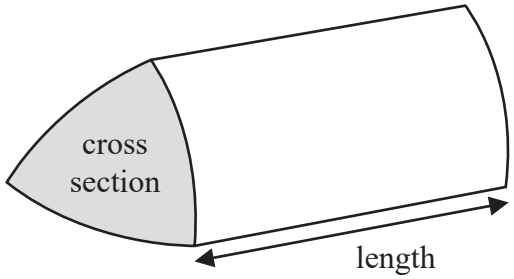
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

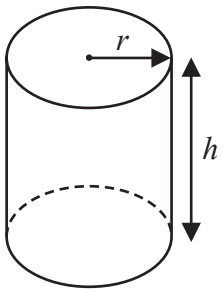


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a list of numbers

13 14 18 23 30 36

From the numbers in the list, write down

(i) an odd number

.....

(1)

(ii) the multiple of 4

.....

(1)

(iii) the factor of 28

.....

(1)

(Total for Question 1 is 3 marks)

2 (a) Write these decimals in order of size.
Start with the smallest decimal.

0.501 0.51 0.5 0.55

.....

(1)

(b) Write 0.3 as a fraction.

.....

(1)

(c) Write 0.46832 correct to 2 decimal places.

.....

(1)

(Total for Question 2 is 3 marks)

3 Here is a rectangle made from 12 square tiles.

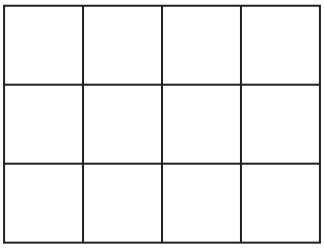


Diagram **NOT** accurately drawn

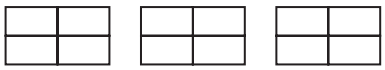
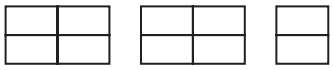
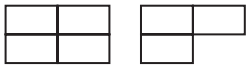
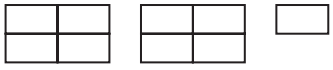
The perimeter of each tile is 20 cm.

Work out the area of the rectangle.

..... cm^2

(Total for Question 3 is 3 marks)

4 The pictogram gives information about the number of rickshaws sold from a garage each month from January to April.

January	
February	
March	
April	
May	

Key:

represents ..... rickshaws

36 rickshaws were sold in January.

(a) Complete the key.

(1)

(b) How many rickshaws were sold in February?

.....

(1)

15 rickshaws were sold in May from the garage.

(c) Show this information on the pictogram.

(1)

Sandeep makes a profit of 5000 rupees on each rickshaw sold from the garage.

His target profit for January was 200 000 rupees.

(d) Did Sandeep reach his target profit for January?
You must show your working.

(2)

(Total for Question 4 is 5 marks)

5 (a) Simplify $10a \times b$

.....

(1)

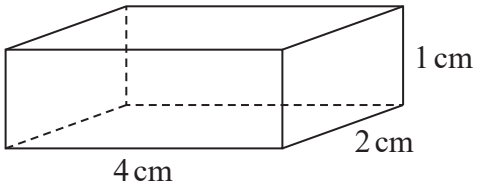
(b) Solve $n + 3 = 7$

$n =$ .....

(1)

(Total for Question 5 is 2 marks)

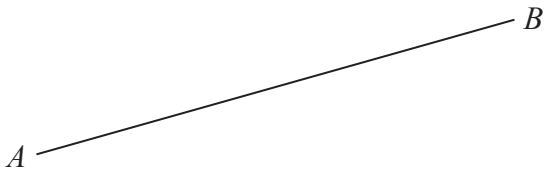
6 (a) Write down the mathematical name of this 3-D shape.



.....

(1)

(b)

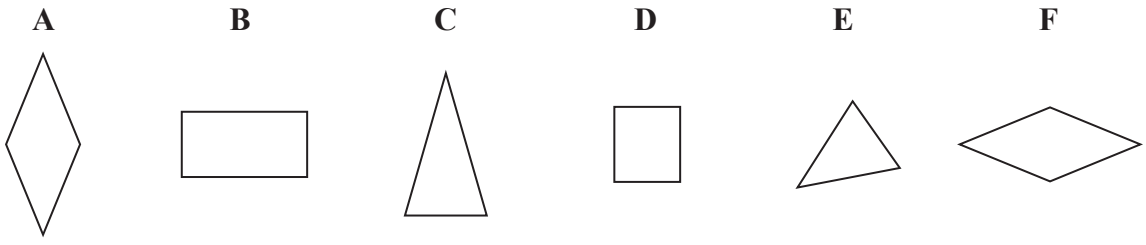


Measure the length of AB.

..... cm

(1)

Here are six shapes.



Two of these shapes are congruent.

(c) Write down the letters of these two shapes.

..... and .....

(1)

(Total for Question 6 is 3 marks)

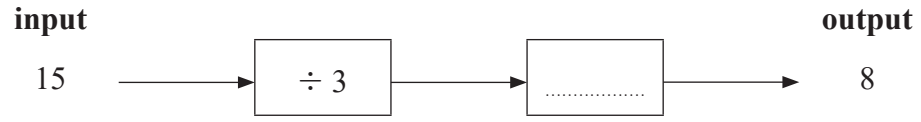
7 (a) Complete the number machine by writing the correct output on the dotted line.

(1)

(b) Complete the number machine by writing the correct input on the dotted line.

(2)

Here is an incomplete number machine.



(c) Complete the number machine.

(1)

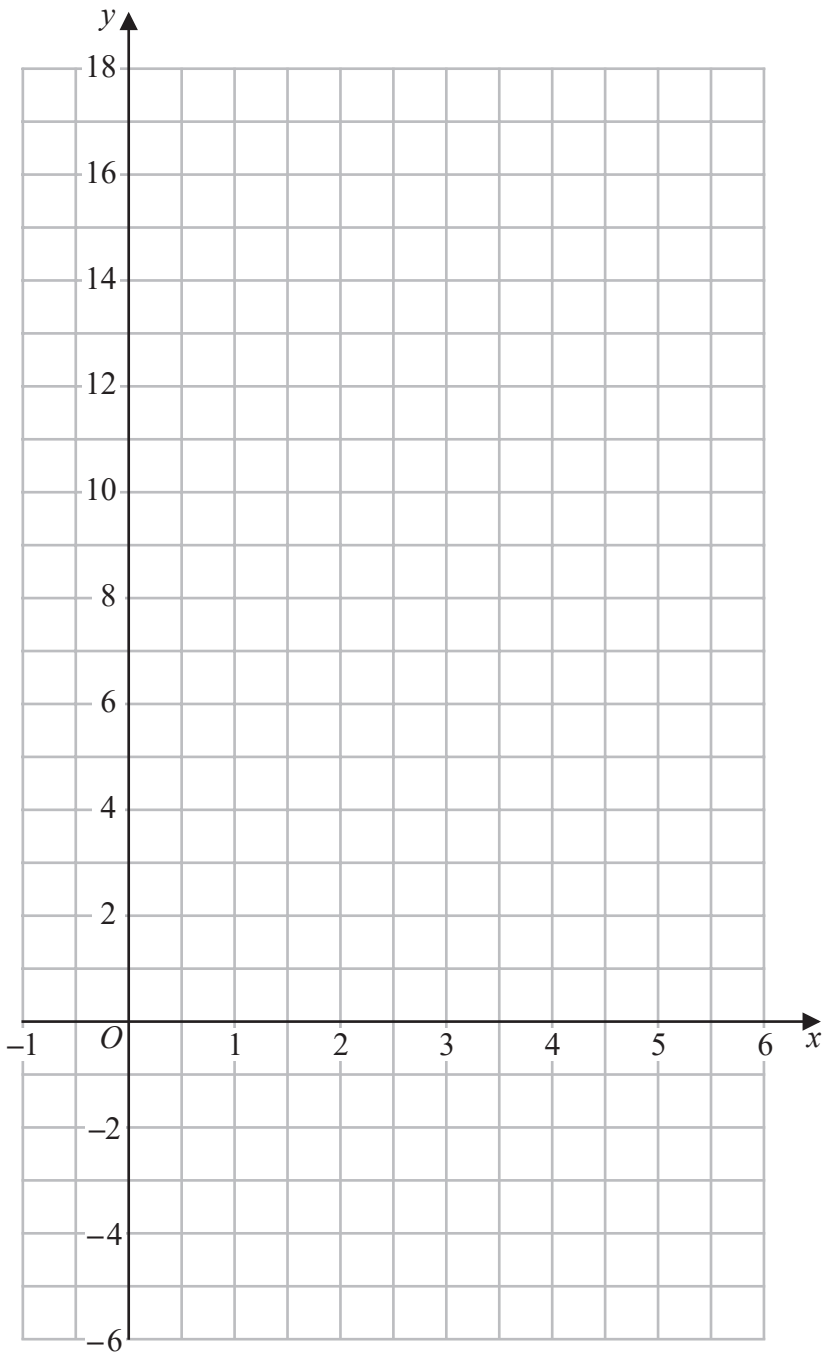
(Total for Question 7 is 4 marks)

8 (a) Complete the table of values for $y = 3x - 1$

x	–1	0	1	2	3	4	5	6
y		–1		5			14	

(2)

(b) On the grid, draw the graph of $y = 3x - 1$ for values of x from –1 to 6



(2)

(Total for Question 8 is 4 marks)

9 There are 25 pens in a packet.

7 of the pens are green.
10 of the pens are black.
The rest of the pens are red.

Jurgen takes at random a pen from the packet.

(a) Find the probability that

(i) the pen is black,

.....

(1)

(ii) the pen is red.

.....

(1)

Heidi records the number of packets of pens sold in her shop to each customer last Friday.
The table shows information about her results.

Number of packets	Frequency
1	14
2	17
3	15
4	12
5	9

(b) Write down the mode of the number of packets.

.....

(1)

(c) Work out the total number of packets of pens sold last Friday.

.....

(2)

(Total for Question 9 is 5 marks)

10 In a shop,

3 bottles of juice cost $5.25

2 bottles of juice and 5 bars of chocolate cost $9.75

Work out the cost of 5 bottles of juice and 3 bars of chocolate.

$.....

(Total for Question 10 is 4 marks)

11 Here are five mathematical signs

+	>	=	∈	<

(a) Write one of these five signs in each box so that each of these statements is true.

(i)

4 °C		9 °C

(1)

(ii)

–3 °C		–8 °C

(1)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

The table gives information about the boiling points and the freezing points of some elements.

Element	Chlorine	Mercury	Neon	Oxygen
Boiling point (°C)	–35	357	–246	–183
Freezing point (°C)	–101	–39	–249	–218

(b) Which of these elements has the lowest boiling point?

.....

(1)

(c) Which of these elements has the largest difference in temperature between its boiling point and its freezing point?

.....

(1)

Dr Strauss is going to cool chlorine from its boiling point to its freezing point.
He knows that it will take 2 minutes for the temperature of the chlorine to go down 10 °C.

(d) Work out how long it will take the chlorine to cool from its boiling point to its freezing point?

..... minutes

(2)

(Total for Question 11 is 6 marks)

12 In 2018, Salman saved 120 riyals each month.

At the start of 2019, Salman increased 120 riyals by 7.5%
He then saved this new amount each month during 2019

Work out how much money Salman saved in total in 2019

..... riyals

(Total for Question 12 is 3 marks)

13 (a) Expand $x(5 - x)$

.....

(1)

(b) Factorise $3y - 21$

.....

(1)

(c) Make p the subject of the formula $f = 3p - d$

.....

(2)

Sergio buys m boxes of seeds and n packets of seeds.

Each box contains 10 seeds.
Each packet contains 6 seeds.

The total number of seeds that Sergio buys is T.

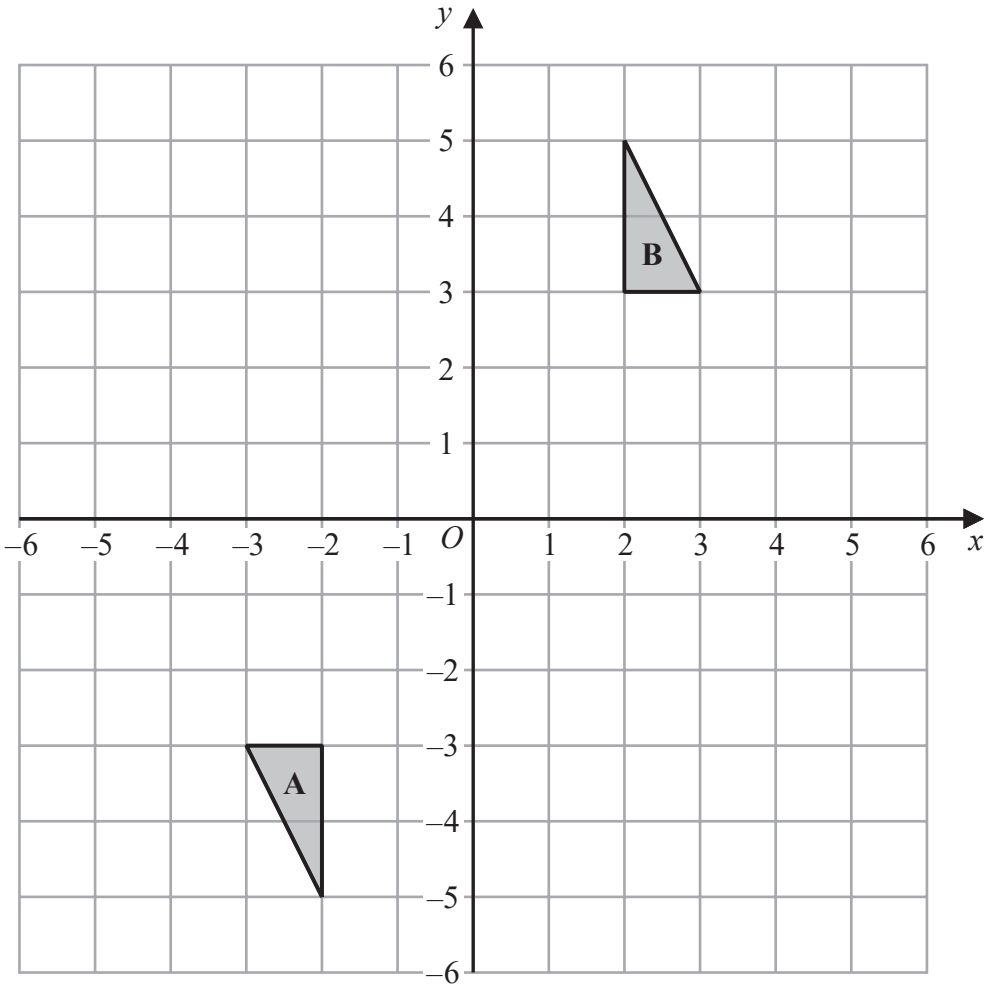
(d) Write down a formula for T in terms of m and n.

.....

(3)

(Total for Question 13 is 7 marks)

14



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

.....

.....

.....

(Total for Question 14 is 2 marks)

15 A regular polygon has n sides.
The size of each interior angle of the regular polygon is 140°

Work out the value of n.

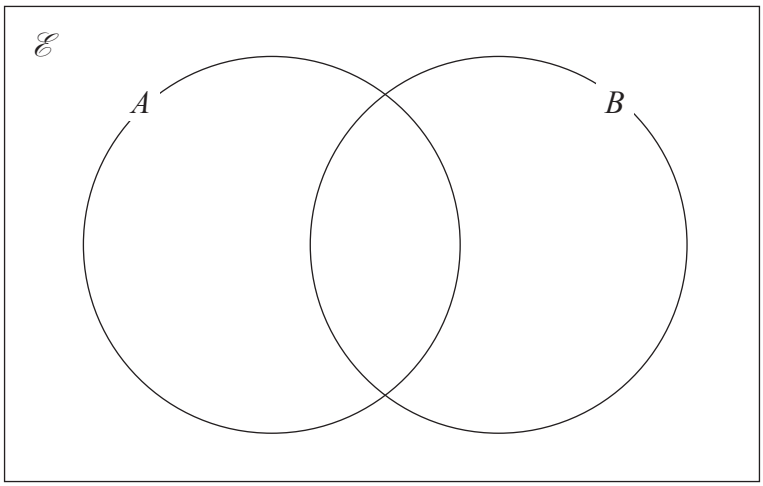
$n =$ .....

(Total for Question 15 is 3 marks)

16 $\mathscr{E} = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{multiples of } 5\}$
$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.



(Total for Question 16 is 3 marks)

17 (a) Simplify $\frac{x^9}{x^2}$

.....

(1)

(b) Write $\frac{7^8 \times 7^4}{7^3}$ as a single power of 7

.....

(2)

(Total for Question 17 is 3 marks)

18 Change 32.4 m^3 into cm^3

..... cm^3

(Total for Question 18 is 2 marks)

19 Show that $4\frac{2}{3} + 3\frac{4}{5} = 8\frac{7}{15}$

(Total for Question 19 is 3 marks)

20 The diagram shows a triangle.

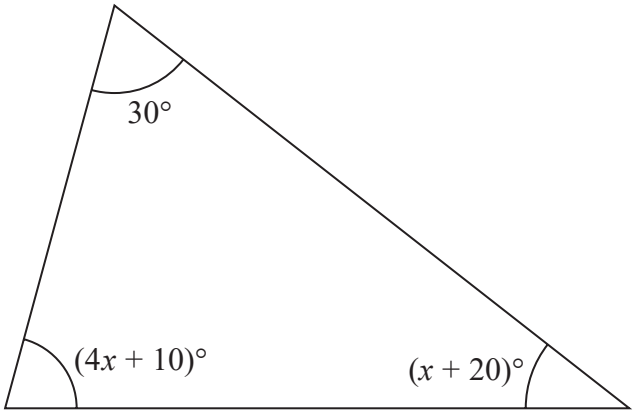


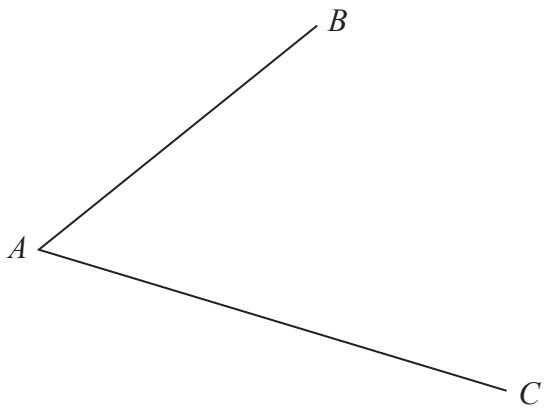
Diagram **NOT** accurately drawn

Work out the value of x.

$x =$ .....

(Total for Question 20 is 4 marks)

21 Use ruler and compasses to construct the bisector of angle *BAC*.
You must show all your construction lines.



(Total for Question 21 is 2 marks)

22 A bag contains only red beads, blue beads, green beads and yellow beads.

The table gives the probabilities that, when a bead is taken at random from the bag, the bead will be blue or the bead will be yellow.

Colour	**red**	**blue**	**green**	**yellow**
Probability		0.24		0.31

The probability that the bead will be green is twice the probability that the bead will be red.

Sofia takes at random a bead from the bag.
She writes down the colour of the bead and puts the bead back into the bag.

She does this 180 times.

Work out an estimate for the number of times she takes a red bead from the bag.

.....

(Total for Question 22 is 4 marks)

23 (a) Solve the inequality $2x + 7 > 4$

.....

(2)

(b) Solve $x^2 - 3x - 40 = 0$
Show clear algebraic working.

.....

(3)

(Total for Question 23 is 5 marks)

24 The table shows the cost, in euros, of Brigitte's car insurance in each of the years 2016, 2017 and 2018

Year	**2016**	**2017**	**2018**
Cost of insurance (euros)	500	545	592

Brigitte says,

"The percentage increase in the cost of my car insurance from 2017 to 2018 is more than the percentage increase in the cost of my car insurance from 2016 to 2017"

(a) Is Brigitte correct?
You must show how you get your answer.

(4)

Henri wants to insure his car.

He gets a discount of 15% off the normal price.
Henri pays 952 euros for his car insurance after the discount.

(b) Work out the discount that Henri gets.

..... euros

(3)

(Total for Question 24 is 7 marks)

25 The density of gold is 19.3 g/cm^3
A gold bar has volume 150 cm^3

Work out the mass of the gold bar.

..... g

(Total for Question 25 is 2 marks)

26 Change a speed of 50 metres per second to a speed in kilometres per hour.

..... kilometres per hour

(Total for Question 26 is 3 marks)

27 The diagram shows a shaded shape *ABCD* made from a semicircle *ABC* and a right-angled triangle *ACD*.

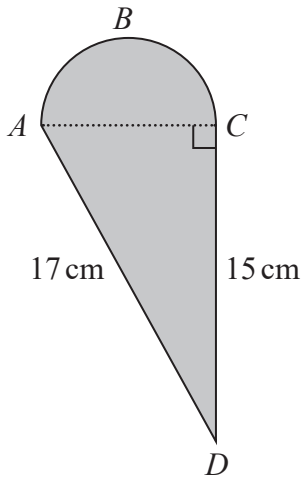


Diagram **NOT** accurately drawn

AC is the diameter of the semicircle *ABC*.

Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 27 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

1.1 2020 | 20200305 | Variant 2F | 4MA1_2F_rms_20200305

Mark Scheme (Results)

January 2020

Pearson Edexcel International GCSE
In Mathematics A (4MA1)
Paper 2F

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January 2020
Publications Code 4MA1_2F_2001_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.

  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)

- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent

- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths					
Apart from questions 19 and 24 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	(i)		13 or 23	1	B1
	(ii)		36	1	B1
	(iii)		14	1	B1
					Total 3 marks

2	(a)		0.5, 0.501, 0.51, 0.55	1	B1
	(b)		$\frac{3}{10}$	1	B1 for $\frac{3}{10}$ oe eg $\frac{30}{100}$
	(c)		0.47	1	B1
					Total 3 marks

3	20 ÷ 4 (= 5) **or** width = 15 **or** length = 20		3	M1	Could be clearly shown on diagram
	(4 × '5') × (3 × '5') **or** 20 × 15 **or** ('5' × '5') × 12 **or** 25 × 12			M1	dep on M1
		300		A1	for 300 SCB1 for 60 × 80 (=4800)
					Total 3 marks

4	(a)		12	1	B1	
	(b)	'12' × 2.5	30	1	B1ft	Ft their 12
	(c)	One and a quarter rectangles	One and a quarter rectangles drawn oe	1	B1	ft their 12
	(d)	36 × 5000 (= 180 000) or 200 000 ÷ 5000 (=40)		2	M1	
			No and 180 000		A1	for no oe **and** 180 000 **or** no oe **and** 40 **or** no oe **and** 20 000 short or 20 000 **and** short/off
						Total 5 marks

5	(a)		10*ab*	1	B1	
	(b)		4	1	B1	
						Total 2 marks

6	(a)		cuboid	1	B1	Accept rectangular cuboid or rectangular prism. Do not accept cube
	(b)		6.5	1	B1	Accept 6.4 – 6.6
	(c)		A and F	1	B1	May be stated or could be circled in list
						Total 3 marks

7	(a)		60	1	B1	for 60
	(b)	3×6 (=18)		2	M1	for 3×6 (=18)
			20		A1	for 20
	(c)		+3	1	B1	or $\times\frac{8}{5}$
						Total 4 marks

8	(a)		−4, (−1), 2, (5), 8, 11, (14), 17	2	B2	for −4, 2, 8, 11, 17
					(B1	for 3 or 4 correct values)
	(b)			2	M1	(may ft from (a) if B1 awarded) for at least 5 points correctly plotted – if no plots, use points at which graph crosses squares or M1
			Graph drawn		A1	for correct graph drawn from $x = -1$ to $x = 6$
						Total 4 marks

9	(a)(i)		$\frac{10}{25}$	1	B1	for 0.4 oe
	(ii)		$\frac{8}{25}$	1	B1	for 0.32 oe (penalise incorrect notation once only in (a))
	(b)		2	1	B1	for 2
	(c)	(1×14) + (2×17) + (3×15) + (4×12) + (5×9) (= 14 + 34 + 45 + 48 + 45)		2	M1	For correct products seen – condone one incorrect product or one missing product
			186		A1	for 186
						Total 5 marks

10	5.25 ÷ 3 (= 1.75)		4	M1	
	[9.75 – (2 × '1.75')] ÷ 5 (= 1.25)			M1	
	(5 × '1.75') + (3 × '1.25') (= 8.75 + 3.75)			M1	
		12.5(0)		A1	
					Total 4 marks

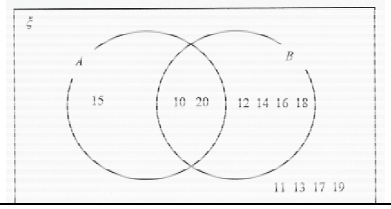
11	(a)(i)		<	1	B1	for <
	(ii)		>	1	B1	for >
	(b)		Neon	1	B1	for neon
	(c)		Mercury	1	B1	for mercury
	(d)	(−35 − − 101) ÷ 10 (=±6.6) **or** ±66 ÷ 10 (= ±6.6) **or** (−35 − − 101) ÷ 5 **or** ±66 ÷ 5 **or** clearly showing counting down from −35 to −95 in 10's or 5's and indicating times by the side **or** from 35 to 95 in 10's or 5's and indicating times by the side with at most one error **or** −95 = 12 mins **or** −100 = 13 mins **or** −105 = 14 mins **or** a correct method to get 66 **and** one of 60 = 12 mins **or** 65 = 13 mins **or** 70 = 14 mins **or** a correct method to get 66 **and** clearly showing counting up or down in 10's or 5's **or** an answer of 13 **or** 14 **or** 13.12		2	M1	
			13.2		A1	for 13.2 or 13 minutes 12 seconds
						Total 6 marks

12	$\frac{7.5}{100}\times 120$ $(=9)$ or 1.075×120 (=129) or $120\times 12\times 0.075$ (108)		3	M1
	(120 + '9') × 12 or "129" × 12 $120\times 12\times 0.075 + 120\times 12$ oe eg 108 + 1440			M1
		1548		A1
				Total 3 marks

13	(a)		$5x - x^2$	1	B1
	(b)		$3(y - 7)$	1	B1
	(c)	$f + d = 3p$ **or** $\frac{f}{3} = p - \frac{d}{3}$		2	M1 A correct first stage in a correct formula
			$p = \frac{f+d}{3}$		A1 for $p = \frac{f+d}{3}$ (must see p =… at some stage) (SCB1 for $p = \frac{f-d}{3}$)
	(d)		$T = 10m + 6n$	3	B3 for $T = 10m + 6n$ oe
					(B2 for $10m + 6n$ or $T = 10m + an$ or $T = bm + 6n$ or $T = 6m + 10n$)
					(B1 for $10m + an$ or $bm + 6n$ or $6m + 10n$) or for T = an incorrect expression in m and n
					Total 7 marks

14		Rotation 180° and (0, 0)	2	B1	Rotation (with none of reflection, translation, enlargement, mirrored, flipped or moved stated)
				B1	180° centre (0, 0) or *O* (award if no vector or equation of line or SF mentioned) (B2 for enlargement SF −1 centre *O*)
					Total 2 marks

15	180 – 140 (= 40) **or** 180(n – 2) = 140n oe		3	M1	Correct method to find exterior angle or correct substitution into formula
	360 ÷ '40' **or** 40n = 360 oe			M1	
		9		A1	
					Total 3 marks

16			3	B3 B3 for all 4 correct regions B2 or 2 or 3 correct regions B1 for 1 correct regions
				Total 3 marks

17 (a)		x^7	1	B1	
(b)	eg $7^8 \times 7^4 = 7^{12}$ or $7^8 \div 7^3 = 7^5$ or $7^5 \times 7^4$ or $7^4 \div 7^3 = 7$ or $7^8 \times 7$ or $7^{'12'} \div 7^3 = 7^{'12'-3}$		2	M1	for one correct step – must be written as a power of 7
		7^9		A1	for 7^9
					Total 3 marks

18	32.4×100^3		2	M1	for 32.4×100^3 oe
		32 400 000		A1	for 32 400 000 accept 3.24×10^7
					Total 2 marks

19	$\frac{14}{3}(+)\frac{19}{5}$ or $(4)\frac{10}{15}(+)(3)\frac{12}{15}$ or $(4)\frac{10a}{15a}(+)(3)\frac{12a}{15a}$		3	M1	for correct improper fractions or fractional part of numbers written correctly over a common denominator
	eg $\frac{14\times5+19\times3}{3\times5}$ or $\frac{70}{15}+\frac{57}{15}$ or $\frac{70a}{15a}+\frac{57a}{15a}$ or $4\frac{10}{15}+3\frac{12}{15}=7\frac{22}{15}$ oe			M1	for correct fractions with a common denominator of 15 or a multiple of 15
	$\frac{70}{15}+\frac{57}{15}=\frac{127}{15}=8\frac{7}{15}$ or $7\frac{22}{15}=8\frac{7}{15}$ or if shows $8\frac{7}{15}=\frac{127}{15}$ at the beginning then show that the addition comes to $\frac{127}{15}$	Shown		A1	dep on M2 for a correct answer from fully correct working **or** shows that RHS = $\frac{127}{15}$ **and** fully correct working shows LHS = $\frac{127}{15}$
					Total 3 marks

20	$30 + 4x + 10 + x + 20$ (= $5x + 60$) **or** $180 - 30$ (=150)		4	M1	Allow $5x + 60 = n$ where $n \neq 180$ or for subtracting 30 from 180	M2 for $5x + 30 = 150$ oe
	e.g. $30 + 4x + 10 + x + 20 = 180$ **or** $5x + 60 = 180$ oe **or** $180 - 30 - 10 - 20$ (=120) oe eg $180 - 60$			M1	for setting up the equation or for subtracting all numerical values of angles from 180	
	$5x = 120$ **or** "120" ÷ 5			M1	dep on M2 for correctly simplifying to $ax = b$ or for dividing "120" by 5	
		24		A1	for 24	
						Total 4 marks

21		Fully correct angle bisector with all relevant arcs shown	2	B2	Fully correct angle bisector with all arcs shown. B1 for all arcs and no angle bisector drawn or for a correct angle bisector within guidelines but not arcs or insufficient arcs
					Total 2 marks

22	1 – (0.24 + 0.31) (= 0.45) or (0.24 + 0.31) × 180 (= 99)		4	M1	or for a correct equation for missing values eg $x + 0.24 + 2x + 0.31 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space)
	'0.45' ÷ 3 (= 0.15) or '0.45' × 180 (= 81) or 180 − 99 (= 81)			M1	(or 0.15 correctly placed in table if not contradicted)
	'0.15' × 180 or '81' ÷ 3			M1	Or an answer of $\frac{27}{180}$
		27		A1	
					Total 4 marks

23 (a)	$2x > 4 - 7$ **or** $x + 3.5 > 2$			2	M1	For a correct first step allow $2x = 4 - 7$ or $x + 3.5 = 2$ or an answer of $x = -1.5$ or $x < -1.5$ or -1.5
			$x > -1.5$		A1	for $x > -1.5$ oe
(b)	$(x \pm 8)(x \pm 5)$	$\frac{-(-3) \pm \sqrt{(-3)^2 - 4 \times 1 \times (-40)}}{2 \times 1}$ **or** $\frac{3 \pm \sqrt{9 + 160}}{2}$			M1	**or** $(x + a)(x + b)$ where $ab = -40$ **or** $a + b = -3$ **OR** correct substitution into quadratic formula (condone one sign error in a, b or c and missing brackets) (if + rather than ± shown then award M1 only unless recovered with answers)
	$(x - 8)(x + 5)$	$\frac{3 \pm \sqrt{169}}{2}$ **or** $\frac{3 \pm 13}{2}$			M1	$\frac{3 \pm \sqrt{169}}{2}$ **or** $\frac{3 \pm 13}{2}$
			8, −5	3	A1	dep on at least M1 for correct values
						Total 5 marks

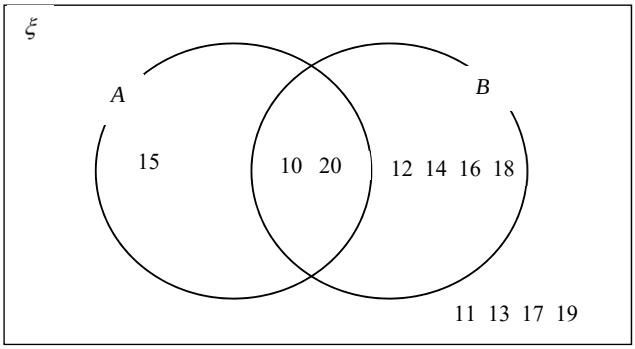
24 (a)	545 – 500 (= 45) **or** 592 – 545 (= 47)		4	M1	may be seen as part of a calculation
	$\frac{45}{500}\times 100(=9)$ **or** $\frac{47}{545}\times 100(=8.6)$			M1	for one correct expression (allow 8 or 8.7 from a correct expression for 8.6 throughout)
	$\frac{45}{500}\times 100(=9)$ **and** $\frac{47}{545}\times 100(=8.6)$			M1	for both correct expressions **or** having found "9%" finds 109% of 545: 1.09 × 545(=594.05) or 9% of 545 (49.05) or having found "8.6%" finds 108.6% of 500: 1.086 × 500(=543) or 8.6% of 500 (43)
		No, 9(%) and 8.6(%)		A1	for no oe, 9% and 8.6% seen or no oe and 9% and 594.05 or 8.6% and 543 or No, 49.05 > 45 or No 594.05 > 592 oe
Alternative mark scheme for 8(a)					
	$\frac{545}{500}\times 100(=109)$ or $\frac{545}{500}(=1.09)$ **or** $\frac{592}{545}\times 100(=108.6)$ or $\frac{592}{545}\left(=1.086\right)$		4	M3	for both correct expressions which should lead to 109 **or** 1.09 **and** 108.6 **or**1.086 (allow 108 or 108.7 from correct working for 108.6 or 1.08 or 1.087 from correct working for 1.086 throughout) (if not M3 then award M2 for one of these expressions)
		No, 109(%) and 108.6(%)		A1	oe eg no and 1.09 and 1.086
(b)	952 ÷ 85 × 100 oe (=1120)		3	M1	for a method to find price before discount M2 for $\frac{952}{85}\times 15$
	0.15 × "1120" or "1120" – 952 oe			M1	for a correct method to find discount
		168		A1	
					Total 7 marks

25	19.3×150		2	M1
		2895		A1
				Total 2 marks

26	50×60 (= 3000) or $50 \div 1000$ (= 0.05 or $\frac{1}{20}$) or $50 \times 60 \times 60$ (= 180 000) or or $\frac{60\times60}{1000}(=3.6)$ or $1000 \div 60 \div 60$ (= 0.27777…. or $\frac{5}{18}$)		3	M1	for 50 with at least one of ÷ 1000 or × 60 or $\frac{60\times60}{1000}(=3.6)$ or $1000 \div 60 \div 60$
	$50\times\frac{60\times60}{1000}$ oe eg $50 \div \frac{5}{18}$			M1	(dep) for a complete method
		180		A1	for 180 (SCB1 for both conversion factors correct but applying them wrongly eg $\frac{50\times1000}{60\times60}$)
					Total 3 marks

27	$(AC^2 =)\ 17^2 - 15^2$		5	M1	
	$(AC =)\sqrt{17^2 - 15^2}\ (= \sqrt{64} = 8)$			M1	
	$\frac{\pi \times '8'}{2} (= 4\pi = 12.566...)$			M1	dep on M2 for $\frac{\pi \times '8'}{2}$ oe or 4π 12.5663…
	'12.566…'+ 15 + 17			M1	for '12.566' + 15 + 17 and no additional values
		44.6		A1	for awrt 44.6
					Total 5 marks
Alternative mark scheme for 11					
	$\cos^{-1}\left(\frac{15}{17}\right) (= 28.0724)$ or $\sin^{-1}\left(\frac{15}{17}\right) (= 61.9275)$		5	M1	for a correct method to find one of the angles
	15 × tan ('28.0724')(= 8) or 15 ÷ tan ('61.9275')(= 8)			M1	
	$\frac{\pi \times '8'}{2}$ (= 4π = 12.566…)			M1	dep on M2 for $\frac{\pi \times '8'}{2}$ or 12.5663… or 4π
	"12.566" + 15 + 17			M1	for "12.566" + 15 + 17 and no additional values
		44.6		A1	for awrt 44.6
					Total 5 marks

Appendix 1



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Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Wednesday 15 January 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/2FR**

Mathematics A

Paper 2FR

Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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P 5 8 4 2 8 A 0 1 2 4

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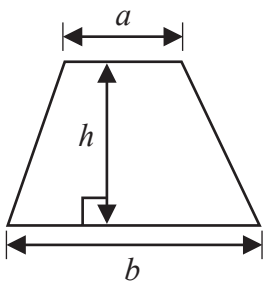
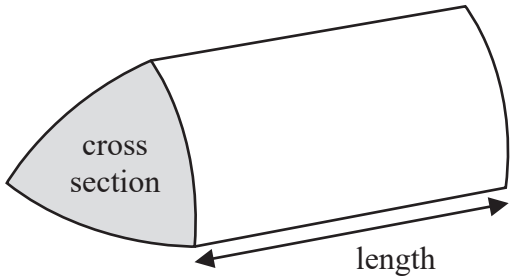
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

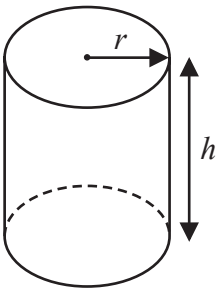


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write in figures the number **seventy thousand, two hundred and sixteen**.

.....

(1)

(b) Write down a common factor of 20 and 30

.....

(1)

(c) Write down a square number that is between 20 and 40

.....

(1)

(d) Find the cube root of 3375

.....

(1)

(e) Write brackets in the following calculation so that the answer is correct.

$$42 - 6 \div 6 - 3 = 40$$

(1)

(Total for Question 1 is 5 marks)

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2 Egor rolled a dice 24 times.
Here are his results.

2	3	5	4	6	2
1	3	3	5	1	3
3	5	5	6	2	5
4	3	4	3	3	4

(a) Complete the frequency table for Egor's results.

Number on dice	Tally	Frequency
1		
2		
3		
4		
5		
6		

(2)

(b) Write down the mode of the numbers that Egor rolled.

.....

(1)

Egor thinks the dice he rolled is biased.

(c) Give a reason why the results could show that the dice is biased.

.....

.....

.....

(1)

(Total for Question 2 is 4 marks)

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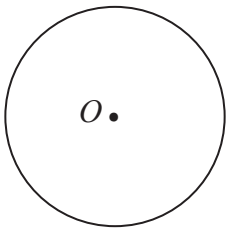
3 The diagram shows a line AB.

(a) At the point A draw an acute angle.
Label your acute angle a.

(1)

The diagram shows a circle with centre O.

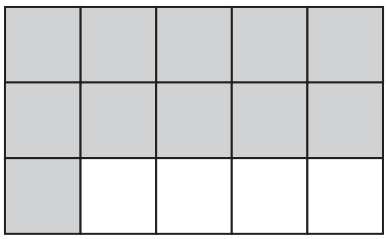


(b) Draw a diameter of the circle.

(1)

(Total for Question 3 is 2 marks)

4 Here is a shape made from squares.



(a) What fraction of this shape is shaded?

.....

(1)

(b) Write $\frac{23}{5}$ as a mixed number.

.....

(1)

(c) Write 0.23 as a fraction.

.....

(1)

(d) Write $\frac{2}{5}$ as a decimal.

.....

(1)

(e) Write these decimals in order of size.
Start with the smallest decimal.

3.61 3.9 3.555 3.82 3.7

.....

(1)

(Total for Question 4 is 5 marks)

5

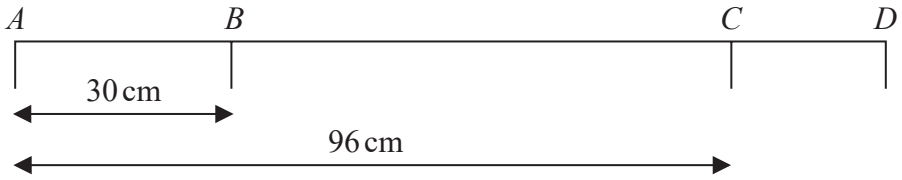


Diagram **NOT** accurately drawn

In the diagram, A, B, C and D are points on a straight line.

$AB = 30$ cm $\quad AC = 96$ cm $\quad BC = 3CD$

Work out the length of AD.

..... cm

(Total for Question 5 is 3 marks)

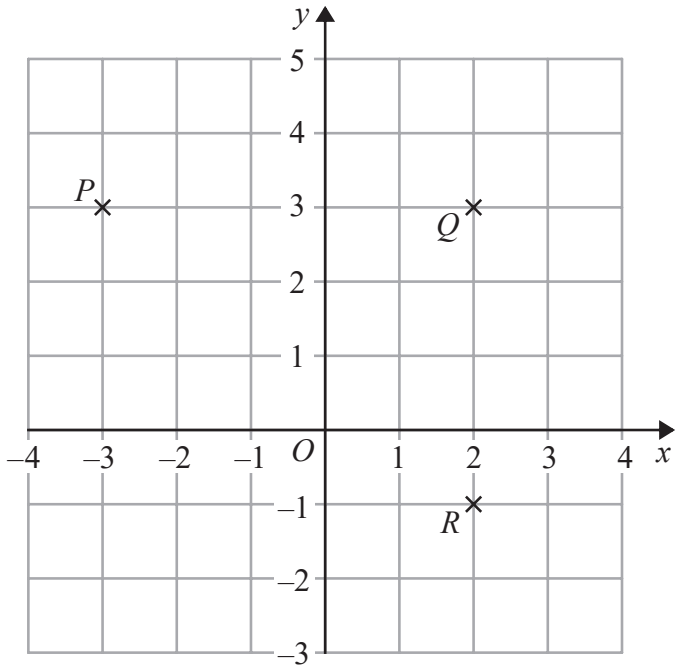
6 Diego left home on Tuesday at 07 50
He arrived home on the same Tuesday at 17 35

Work out the length of time that Diego was away from home on Tuesday.
Give your answer in hours and minutes.

..... hours ..... minutes

(Total for Question 6 is 2 marks)

7 P, Q and R are three points marked on a grid.



(a) Write down the coordinates of point Q.

(..... , ...)

(1)

S is the point such that $PQRS$ is a rectangle.

(b) Find the coordinates of point S.

(..... , ...)

(1)

(c) Find the coordinates of the midpoint of PR.

(..... , ...)

(2)

(Total for Question 7 is 4 marks)

8 Lin has 60 bricks.
He puts his 60 bricks into a bag.

Some information about the 60 bricks is shown in the two-way table.

	orange	blue	yellow	Total
small		7	14	
large	13			33
Total		23		60

(a) Complete the two-way table.

(3)

One of the bricks is taken at random from the bag.

(b) Write down the probability that this brick is blue.

.....

(1)

Lin now puts all his large bricks into a sack.
He takes at random a large brick from the sack.

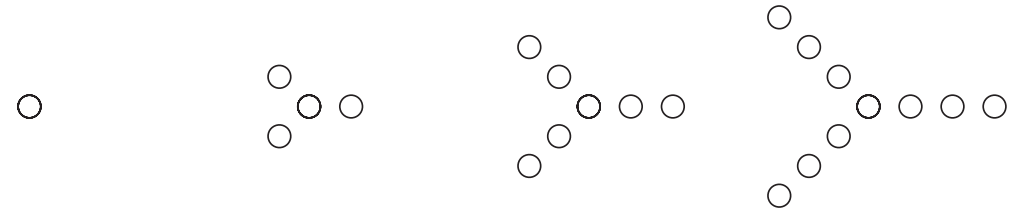
(c) Write down the probability that this large brick is orange.

.....

(2)

(Total for Question 8 is 6 marks)

9 Here is a sequence of patterns made from circles.



Pattern number 1 | Pattern number 2 | Pattern number 3 | Pattern number 4

(a) In the space below, draw Pattern number 5

(1)

(b) Complete the table.

Pattern number	1	2	3	4	5	6
Number of circles	1	4	7	10		

(1)

(c) Work out the number of circles in Pattern number 8

.....

(1)

C is the number of circles in Pattern number P

(d) Write down a formula for C in terms of P

.....

(2)

A different sequence of patterns is made from triangles.
The rule to find the number of triangles in each pattern is

multiply the Pattern number by 5 and subtract 4

(e) Is there a pattern in this sequence that is made from exactly 136 triangles?
You must give a reason for your answer.

(1)

(Total for Question 9 is 6 marks)

10 Here are four different numbers written in order of size.

3 6 m n

The range of the four numbers is 13
The median of the four numbers is 8.5

Find the value of m and the value of n.

m = ...

n = ...

(Total for Question 10 is 2 marks)

11

1 euro = 9.3 Hong Kong dollars (HKD)
1 euro = 4.4 dirham (AED)

(a) Change 400 euros to Hong Kong dollars.

..... HKD

(1)

(b) Change 418 dirham to euros.

..... euros

(1)

(c) Change 651 Hong Kong dollars to dirham.

.....AED

(2)

(Total for Question 11 is 4 marks)

12 (a) Simplify $k + k + k + k$

.....

(1)

$$f = 9 \times 9 \times 9 \times 9$$

(b) (i) Write f as a single power of 9

.....

(ii) Write f as a single power of 3

.....

(2)

(c) Write $5^{17} \times 5^{2}$ as a single power of 5

.....

(1)

(d) Write 800 as a product of its prime factors.
Show your working clearly.

.....

(2)

(Total for Question 12 is 6 marks)

13 Betsy was given $75 for her birthday.

She saved some of the money and spent the rest on a T-shirt and a bag.

Betsy saved 40% of the $75
She spent $12 more on the bag than she spent on the T-shirt.

Work out how much Betsy spent on the bag.

$.....

(Total for Question 13 is 4 marks)

14 Iona buys a box of cereal.

The cereal in the box weighs 0.75 kg.
Each helping of the cereal eaten by Iona has a weight of 40 g.

(a) Write 40 g as a fraction of 0.75 kg.
Give your answer in its simplest form.

.....

(2)

The cereal in the box contains 6.8 g of protein for each 100 g of cereal.

(b) Work out the amount of protein in each of Iona's helpings of cereal.

..... g

(2)

3 g of every 40 g helping of cereal is fat.

(c) Write 3 g as a percentage of 40 g.

.....%

(2)

(Total for Question 14 is 6 marks)

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15

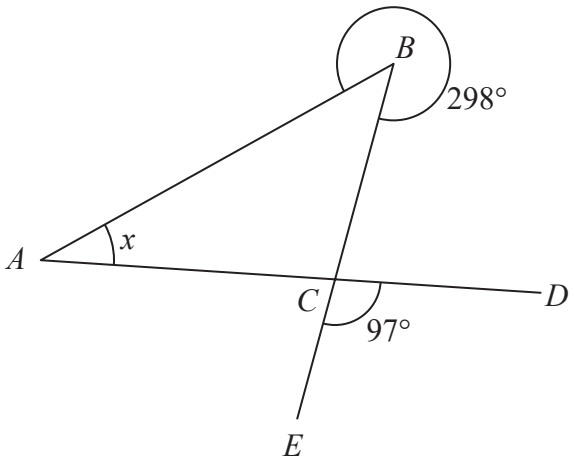

Diagram **NOT** accurately drawn

ABC is a triangle.
D and *E* are points such that *ACD* and *BCE* are straight lines.

reflex angle *ABC* = 298°
angle *ECD* = 97°

Work out the size of angle *x*.
Give a reason for each stage of your working.

x = ... °

(Total for Question 15 is 4 marks)

16 The table gives information about the amount of money, in £, that Fiona spent in a grocery store each week during 2019

Amount spent (£x)	Frequency
$0 \leqslant x < 20$	5
$20 \leqslant x < 40$	11
$40 \leqslant x < 60$	8
$60 \leqslant x < 80$	19
$80 \leqslant x < 100$	9

Work out an estimate for the total amount of money that Fiona spent in the grocery store during 2019

£.....

(Total for Question 16 is 3 marks)

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DO NOT WRITE IN THIS AREA

17 Three tins, A, B and C, each contain buttons.

Tin A contains x buttons.
Tin B contains 4 times the number of buttons that tin A contains.
Tin C contains 7 fewer buttons than tin A.

The total number of buttons in the three tins is 137

Work out the number of buttons in tin C.

.....

(Total for Question 17 is 4 marks)

18 (a) Expand $e(3e - 5)$

.....

(1)

(b) Factorise $35 + 5f$

.....

(1)

(c) Simplify $(4pq^2)^3$

.....

(2)

(Total for Question 18 is 4 marks)

19 The diagram shows a rectangle and a diagonal of the rectangle.

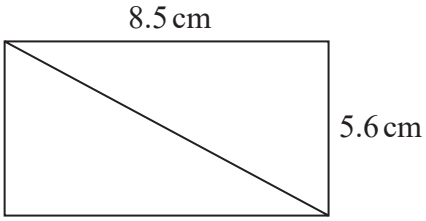

Diagram **NOT** accurately drawn

Work out the length of the diagonal of the rectangle.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 19 is 3 marks)

20 A plane takes 3 hours 36 minutes to fly from the Cayman Islands to New York.
The plane flies a distance of 2470 km.

Work out the average speed of the plane in km/h.
Give your answer correct to the nearest whole number.

..... km/h

(Total for Question 20 is 3 marks)

21 Solve the simultaneous equations

$$3x + 5y = 6$$
$$7x - 5y = -11$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 21 is 3 marks)

22 Hamish buys a new car for \$20 000
The car depreciates in value by 19% each year.

Work out the value of the car at the end of 3 years.
Give your answer to the nearest \$.

\$.....

(Total for Question 22 is 3 marks)

23 The diagram shows a box in the shape of a cuboid.

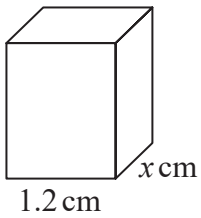

Diagram **NOT** accurately drawn

The box is put on a table.
The face of the box in contact with the table has length 1.2 metres and width x metres.

The force exerted by the box on the table is 27 newtons.
The pressure on the table due to the box is 30 newtons/m^2

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Work out the value of x.

$x =$ .....

(Total for Question 23 is 3 marks)

24 The table shows information about the surface area of each of the world's oceans.

Ocean	Surface area in square kilometres
Pacific	1.56×10^8
Indian	6.86×10^7
Southern	2.03×10^7
Arctic	1.41×10^7
Atlantic	1.06×10^8

(a) Write 1.56×10^8 as an ordinary number.

.....

(1)

(b) Which ocean has the least surface area?

.....

(1)

(c) Work out the difference, in square kilometres, between the surface area of the Atlantic Ocean and the surface area of the Indian Ocean.
Give your answer in standard form.

..... square kilometres

(2)

(Total for Question 24 is 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

25 (a) Write down the integer values of x that satisfy the inequality $-2 < x \leqslant 4$

.....

(2)

The region **R**, shown shaded in the diagram, is bounded by three straight lines.

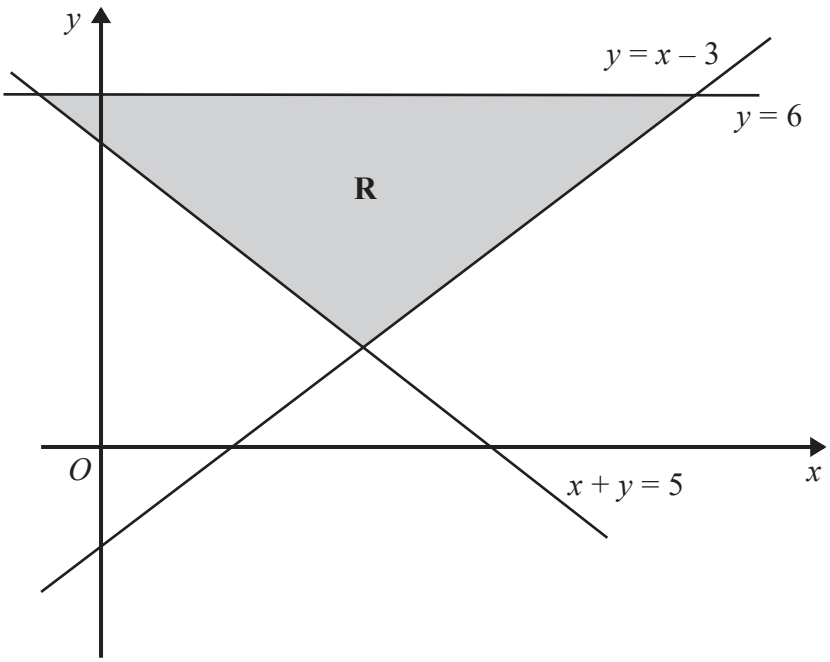

Diagram **NOT** accurately drawn

(b) Write down the three inequalities that define the region **R**.

.....

.....

.....

(2)

(Total for Question 25 is 4 marks)

26 The diagram shows two congruent isosceles triangles and parts of two congruent regular polygons, **X** and **Y**.

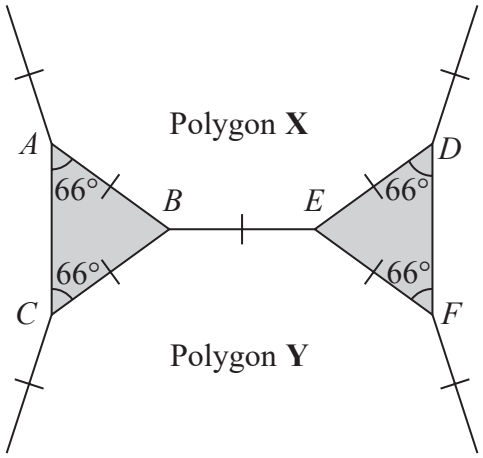

Diagram **NOT** accurately drawn

The two regular polygons each have n sides.

Work out the value of n.

$n =$ .....

(Total for Question 26 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

2.1 2020 | 20200305 | Variant 2FR | 4MA1_2FR_rms_20200305

Pearson
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Mark Scheme (Results)

January 2020

Pearson Edexcel International GCSE
In Mathematics A (4MA1)
Paper 2FR

Edexcel and BTEC Qualifications

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January 2020
Publications Code 4MA1_2FR_2001_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.

  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)

- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent

- indep – independent
- awrt – answer which rounds to
- eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths A January 2020 – Paper 2FR Mark scheme

Apart from Questions 12d and 21, where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.

Question	Working	Answer	Mark	Notes
1 (a)		70 216	1	B1 cao
(b)		1, 2, 5 or 10	1	B1 Any of these values with no other incorrect value
(c)		25 or 36	1	B1 One or both of 25 or 36 and no other incorrect value
(d)		15	1	B1
(e)		$42 - 6 \div (6 - 3)$	1	B1 Allow $42 - (6 \div (6 - 3))$
				Total 5 marks

2 (a)		Frequencies and tallies of 2, 3, 8, 4, 5, 2	2	B2 All frequencies and tallies correct B1 for 3, 4 or 5 frequencies or tallies correct NB. Frequencies and tallies must be in the correct column. Accept 2/24 etc. in frequency column
(b)		3	1	B1ft Follow through from table
(c)		Sensible statement	1	B1 Not enough 1's or 6's Too many 3's Rolled a 3 a third of the times Should expect to get 4 of each number
				Total 4 marks

3 (a)		An acute angle drawn at *A*	1	B1
(b)		Diameter drawn	1	B1 Diameter should not extend significantly beyond circumference.
				Total 2 marks

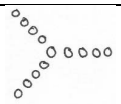
Question		Working	Answer	Mark	Notes
4	(a)		$\frac{11}{15}$	1	B1oe
	(b)		$4\frac{3}{5}$	1	B1oe eg $4\frac{6}{10}$
	(c)		$\frac{23}{100}$	1	B1oe eg $\frac{46}{200}$
	(d)		0.4	1	B1 Accept 0.40
	(e)		3.555, 3.61, 3.7, 3.82, 3.9	1	B1
					Total 5 marks

5	(*BC* =) 96 – 30 (=66)		3	M1
	96 + (66 ÷ 3) oe			M1
		118		A1
				Total 3 marks

6		9 hours 45 mins	2	B2 B1 for 9 hours or 45 minutes
				Total 2 marks

7	(a)	(2, 3)	1	B1
	(b)	(−3, −1)	1	B1
	(c)	(−0.5, 1)	2	B2 B1 for (−0.5, *y*) or (*x*, 1) or (1, −0.5)
				Total 4 marks

Question		Working	Answer	Mark	Notes
8	(a)	<table><tr><th></th><th>orange</th><th>blue</th><th>yellow</th><th>total</th></tr><tr><th>small</th><td>6</td><td>7</td><td>14</td><td>27</td></tr><tr><th>large</th><td>13</td><td>16</td><td>4</td><td>33</td></tr><tr><th>total</th><td>19</td><td>23</td><td>18</td><td>60</td></tr></table>		3	B3 All 6 entries correct B2 for 4 or 5 correct entries B1 for 2 or 3 correct entries
	(b)		$\frac{23}{60}$	1	B1 Allow 0.38(333...) or 38(.33...)%
	(c)		$\frac{13}{33}$	2	B2 B1 for $\frac{n}{33}$ where $n < 33$ or $\frac{13}{m}$ where $m > 13$
					Total 6 marks

9	(a)			1	B1 Correct diagram
	(b)		13, 16	1	B1 Both values correct
	(c)		22	1	B1
	(d)		$C = 3P - 2$ oe	2	B2 B1 for $3P$ or $3P$ + constant (constant $\neq -2$)
	(e)		(Yes) pattern 28 has 136 triangles	1	B1 or $5 \times 28 - 4 = 136$ oe Sight of 28 is sufficient
					Total 6 marks

10	$n - 3 = 13$ oe or $n = 16$ or $(6 + m) \div 2 = 8.5$ oe or $m = 11$		2	M1
		$n = 16$ & $m = 11$		A1 Both values correct
				Total 2 marks

Question		Working	Answer	Mark	Notes
11	(a)		3720	1	B1
	(b)		95	1	B1
	(c)	$\frac{651}{9.3} \times 4.4$		2	M1
			308		A1
					Total 4 marks

12	(a)		$4k$	1	B1	
	(b) (i)		9^4	1	B1	
	(ii)		3^8	1	B1	
	(c)		5^{19}	1	B1	
	(d)			2	M1	A factor tree / division ladder of 3 or more factors ($\neq 1$), multiplying to 800, which must include 2 and 5. Condone 1 error when product $\neq 800$
			$2\times2\times2\times2\times2\times5\times5$		A1	Dep on M1 oe eg $2^5 \times 5^2$

13	$0.4 \times 75 (= 30)$ oe		4	M1 M2 for $0.6 \times 75 (= 45)$ oe
	$75 - 30 (= 45)$			M1
	(T-Shirt =) $\frac{45-12}{2}$ or (Bag =) $\frac{45+12}{2}$ oe or $t + (t + 12) = 45$ oe			M1 (T-shirt = \$16.50)
		28.5(0)		A1
				Total 4 marks

Question		Working	Answer	Mark	Notes
14	(a)	$\frac{40}{750}$ oe		2	M1 Numerator and denominator must be integers.
			$\frac{4}{75}$		A1
	(b)	$\frac{40}{100} \times 6.8$ oe		2	M1
			2.72		A1
	(c)	$\frac{3}{40} \times 100$ oe		2	M1
			7.5		A1
					Total 6 marks

15	$\angle ABC = 360^\circ - 298^\circ (= 62^\circ)$ or $\angle BCA = 97^\circ$		4	M1 Could be marked on diagram
		21		A1
	vertically opposite, (are equal) angles at (around) a point, (= 360°) angles in a triangle (= 180°)			B2 B2 for 3 correct reasons which must include the underlined words B1 for 1 or 2 correct reasons which must include the underlined words Any B marks dep on M1
				Total 4 marks

16	10 × 5 + 30 × 11 + 50 × 8 + 70 × 19 + 90 × 9 (50 + 330 + 400 + 1330 + 810)		3	M2 Correct products using midpoints (allowing one error) with intention to add. M1 for products using frequency and a consistent value within the range (allowing one error) with intention to add. or correct products using midpoint without intention to add.
		2920		A1 N.B. 2920 ÷ 52(=56.15...) gains M2 only
				Total 3 marks

Question	Working	Answer	Mark	Notes
17	$4x$ or $x - 7$		4	M1 Correct expression for B or C
	$x + 4x + x - 7 = 137$ oe			M1 Correct equation
	$x = 144 \div 6$ (=24) or $6x = 144$			M1 Gathering up the x's and numbers Dep on previous M1
		17		A1
				Total 4 marks

18	(a)		$3e^2 - 5e$	1	B1
	(b)		$5(7 + f)$	1	B1
	(c)		$64p^3q^6$	2	B2 B1 for 2 correct parts of the product
					Total 4 marks

19	$8.5^2 + 5.6^2$ (=103.61)		3	M1
	$\sqrt{8.5^2 + 5.6^2}$			M1
		10.2		A1 awrt 10.2
				Total 3 marks

20	3 hours 36 mins = 216 mins or 3.6 hours		3	M1
	$2470 \div 3.6$ or $2470 \div 216 \times 60$ oe			M1 Allow $2470 \div 3.36$ (=735 or better)
		686		A1
				Total 3 marks

21	(adding) $10x = -5$ or $21x + 35y = 42$ $21x - 15y = -33$ then $50y = 75$		3	M1 Correct method to eliminate x or y: coefficients of x or y the same **and** correct operator to eliminate selected variable or correct substitution for x or y into 2nd equation
		$x = -0.5$ oe $y = 1.5$ oe		A1 Both A marks dep on M1 A1
				Total 3 marks

Question	Working	Answer	Mark	Notes
22	$20\,000 \times 0.81^3$			M2 M1 for $20\,000 \times 0.81$ (= 16 200) or $20\,000 \times 1.19$ (= 23 800) or $20\,000 \times 1.19^3$ (= 33 703.18))
		10 629		A1 Accept 10 628 → 10.629
				Total 3 marks

23	$30 = \frac{27}{1.2x}$		3	M2 M1 for $\frac{27}{1.2x}$
		0.75		A1 oe
				Total 3 marks

24	(a)		156 000 000	1	B1
	(b)		Arctic	1	B1
	(c)		3.74×10^7	2	B2 B1 for 37 400 000 (oe but not in standard form)
					Total 4 marks

25	(a)		−1, 0, 1, 2, 3, 4	2	B2 B1 for −2, −1, 0, 1, 2, 3, 4 or −1, 0, 1, 2, 3
	(b)		$y \leq 6$ $x + y \geq 5$ $y \geq x - 3$	2	B2 for 3 correct inequalities B1 for 2 correct inequalities (In both cases allow < in place of ≤, and > in place of ≥)
					Total 4 marks

Question	Working	Answer	Mark	Notes
26	180 – 2 × 66 (= 48) (360 – "48") ÷ 2 (= 156) 180 – "156" (= 24) 360 ÷ "24"		3	M1 M1
	Alt : 180 – 2 × 66 (= 48) 360 ÷ (0.5 × "48")			M1 M1
		15		A1
				Total 3 marks

				Total : 100 marks

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Centre Number | | | | | |

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Thursday 4 June 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/2F**

Mathematics A

Paper 2F

Foundation Tier

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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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1/1/1/1/

P 6 2 6 5 4 A 0 1 2 4

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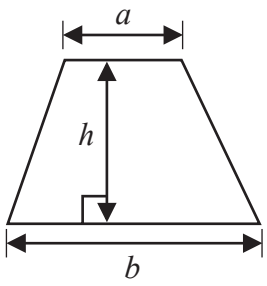
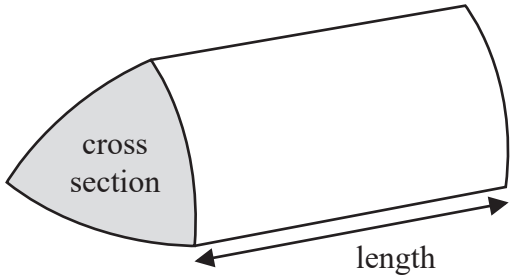
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

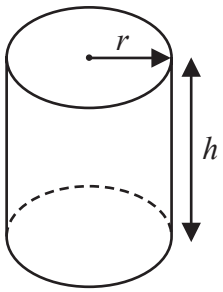


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY FOUR questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a list of numbers.

1	17	21	25	26	31	39	64

From this list, write down

(a) an even number

.....

(1)

(b) a multiple of 3

.....

(1)

(c) a prime number

.....

(1)

(d) a cube number

.....

(1)

(Total for Question 1 is 4 marks)

2 (a) Change 3 litres into millilitres.

.....millilitres

(1)

(b) Change 6500 grams into kilograms.

.....kilograms

(1)

(Total for Question 2 is 2 marks)

3 Paula asks 16 members of her class the number of pets they each have.
Here are her results.

1	2	2	4	0	1	2	1
3	3	4	1	1	0	3	2

(a) Complete the frequency table for her results.

Number of pets	Tally	Frequency
0		
1		
2		
3		
4		

(2)

(b) Write down the mode for the number of pets.

.....

(1)

(c) Work out the range for the number of pets.

.....

(1)

(Total for Question 3 is 4 marks)

4 The table gives the minimum temperature for January 2018 in each of six cities.

City	Minimum temperature (°C)
Barcelona	3
Donetsk	−10
Mexico City	−1
Mombasa	22
New York	−15
Sydney	15

(a) Which of these six cities has the lowest minimum temperature?

.....

(1)

(b) Work out the difference between the minimum temperature of Donetsk and the minimum temperature of Sydney.

..... °C

(1)

The minimum temperature in Edmonton for January 2018 was 50°C less than the minimum temperature in Mombasa for January 2018

(c) Work out the minimum temperature in Edmonton for January 2018

..... °C

(1)

(Total for Question 4 is 3 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

5 (a) Write these decimals in order of size.
Start with the smallest decimal.

0.9 0.035 0.003 0.539 0.5

.....

(1)

(b) Write 0.6 as a percentage.

.....%

(1)

(c) Write $\frac{60}{7}$ as a mixed number.

.....

(1)

(d) Work out the difference between $\frac{19}{20}$ and 0.68

Give your answer as a decimal.

.....

(2)

(Total for Question 5 is 5 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

6 Here are the first five terms of a number sequence.

3 7 11 15 19

(a) Write down the next term of the sequence.

.....

(1)

(b) Explain how you worked out your answer.

.....

(1)

(c) Find the first number greater than 70 that is in the sequence.

.....

(2)

Ada says,

"96 is a number in the sequence"

(d) Is Ada correct?
You must give a reason for your answer.

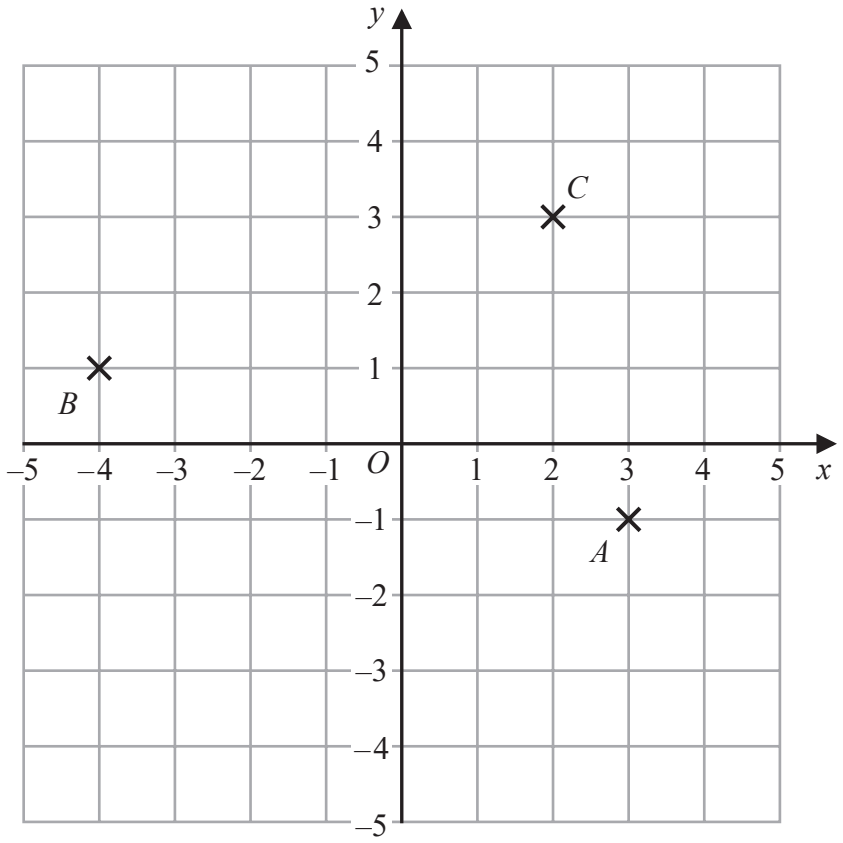
.....

.....

(1)

(Total for Question 6 is 5 marks)

7 The diagram shows three points, A, B and C, marked on a grid.



(a) Write down the coordinates of point A.

(..... , ...)

(1)

The coordinates of the point D are $(-2, -4)$

(b) On the grid, mark with a cross ($\times$) the position of D.
Label the cross D.

(1)

(c) Find the coordinates of the midpoint of BC.

(..... , ...)

(2)

(d) On the grid, draw the line with equation $x = 4$

(1)

(Total for Question 7 is 5 marks)

8 Lucas is going on a country walk.

Lucas works out how long each part of his walk will take.
This information is shown in the following table.

	Time taken
Walk from home to Village A	20 minutes
Walk from Village A to Village B	35 minutes
Stop for lunch in Village B	1 hour 15 minutes
Walk from Village B to home	30 minutes

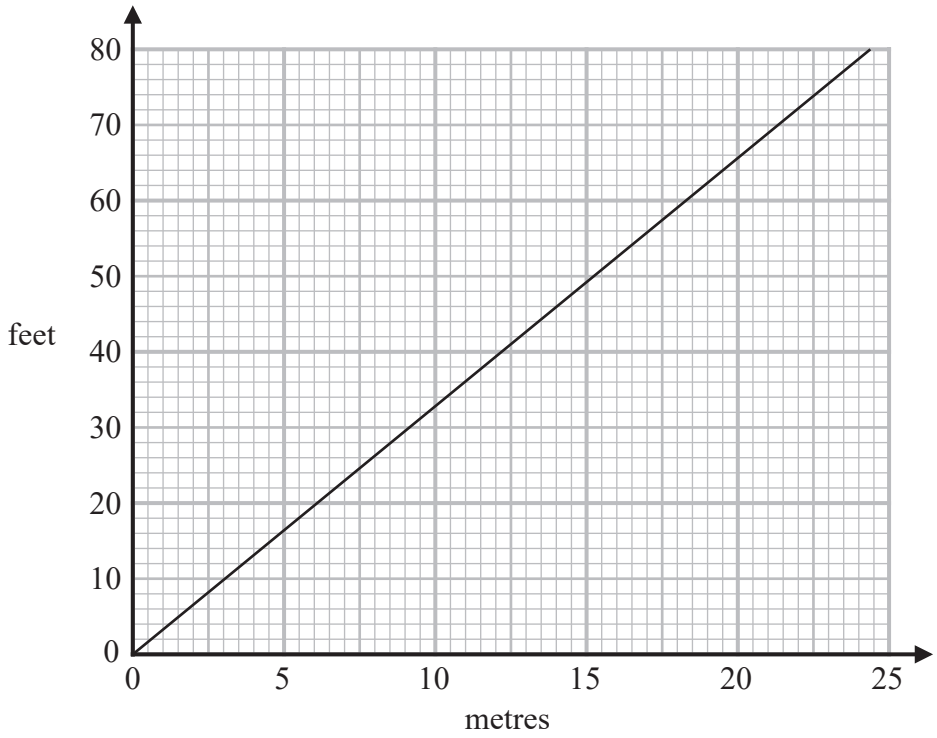
Lucas leaves home at 11 10

At what time will Lucas get home?

.....

(Total for Question 8 is 3 marks)

9 Below is a conversion graph to change between metres and feet.



(a) Use the graph to change

(i) 10 metres to feet,

.....feet

(ii) 50 feet to metres.

.....metres

(2)

Joss lives 820 metres above sea level.
Nicky lives 2850 feet above sea level.

(b) Which is the greater, 820 metres or 2850 feet?
You must show how you get your answer.

(2)

(Total for Question 9 is 4 marks)

10 Hugo records the number of pairs of trainers sold in each of four shoe shops last Saturday. He is going to draw a pie chart for his results.

The incomplete table shows two of Hugo's results and the sizes of three of the angles in his pie chart.

Name of shop	Number of pairs of trainers	Angle in pie chart
ABC Shoes	.....	30°
Kilian Stuart Sports	18	45°
One Stop Shoes	48	..... °
Superfast Trainers	.....	165°

Complete the table.

(Total for Question 10 is 4 marks)

11 Work out 23% of 450 millilitres.

.....millilitres

(Total for Question 11 is 2 marks)

12 (a) Write down all the factors of 9

.....

(1)

(b) Find the lowest common multiple (LCM) of 15 and 70

.....

(2)

(Total for Question 12 is 3 marks)

13 The diagram shows the plan of Sophia's gym floor.

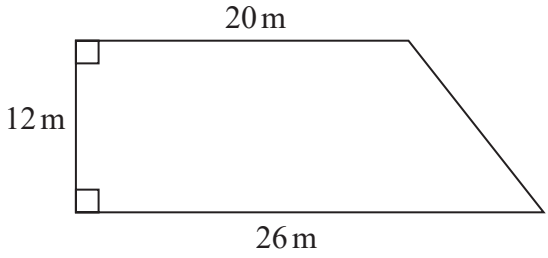


Diagram **NOT** accurately drawn

Sophia is going to paint all the gym floor.

Each tin of paint she is going to use covers an area of 20 m^2

There is a special offer on the paint that Sophia is going to buy.

Special Offer

1 tin for $13
4 tins for $40

Work out the least amount of money that Sophia has to pay in order to buy all the paint she needs.
Show your working clearly.

$ .....

(Total for Question 13 is 5 marks)

14 (a) Factorise $25f - 10$

.....

(1)

(b) Make y the subject of the formula $c = 5y - h$

.....

(2)

(c) Solve the inequality $4x + 7 > 2$

.....

(2)

(Total for Question 14 is 5 marks)

15 Show that $\frac{2}{5} \div \frac{11}{20} = \frac{8}{11}$

(Total for Question 15 is 2 marks)

16 The table shows information about the lengths of time, in minutes, 120 customers spent in a supermarket.

Length of time (L minutes)	Frequency
$20 < L \leqslant 30$	6
$30 < L \leqslant 40$	26
$40 < L \leqslant 50$	31
$50 < L \leqslant 60$	40
$60 < L \leqslant 70$	17

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean length of time spent by the 120 customers in the supermarket.

.....minutes

(4)

(Total for Question 16 is 5 marks)

17 Here is a list of ingredients needed to make apple crumble for 6 people.

Apple Crumble
Ingredients for 6 people
12 apples 150 g butter 195 g flour 90 g oats 120 g sugar

Nadiya wants to make apple crumble for 14 people.

(a) Work out the amount of butter she needs.

.....g

(2)

Alison makes apple crumble for a group of people.

She uses 630 g of oats.

(b) Work out the number of people in the group.

.....

(2)

At a cake sale, Michael sells some lemon cakes and some chocolate cakes.

the number of lemon cakes he sells : the number of chocolate cakes he sells = 2 : 7

Michael sells a total of 162 cakes.

(c) Work out the number of lemon cakes Michael sells.

.....

(2)

(Total for Question 17 is 6 marks)

18

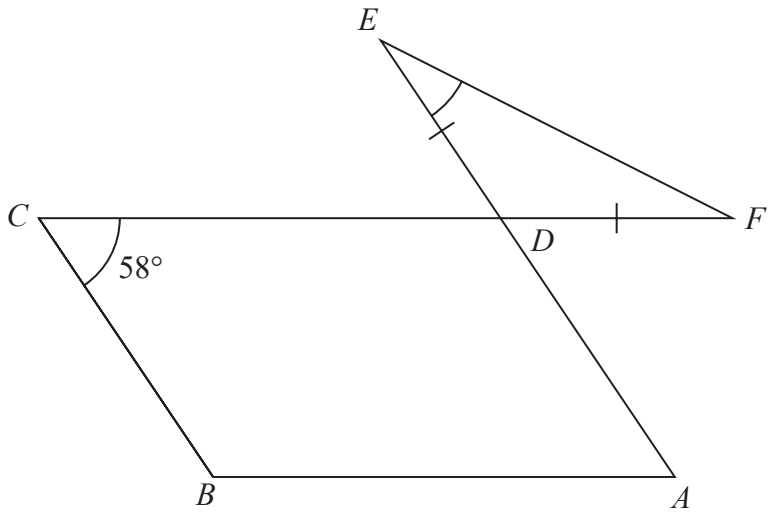


Diagram **NOT** accurately drawn

The diagram shows a parallelogram *ABCD* and an isosceles triangle *DEF* in which *DE* = *DF*

CDF and *ADE* are straight lines.
Angle *BCD* = 58°

Work out the size of angle *DEF*.
Give a reason for each stage of your working.

.....°

(Total for Question 18 is 5 marks)

19 Andreas, Isla and Paulo share some money in the ratios 3 : 2 : 5

The **total** amount of money that Isla and Paulo receive is £76 more than the amount of money that Andreas receives.

Andreas buys a video game for £48.50 with some of his share of the money.

Work out how much money Andreas has left from his share of the money when he has bought the video game.

£.....

(Total for Question 19 is 4 marks)

20 Himari's annual salary is 3 130 000 Japanese Yen (JPY).
She gets a salary increase of 4%

(a) Work out Himari's salary after this increase.

.....JPY

(3)

Kaito bought a car.
The value of the car when Kaito bought it was 750 000 JPY.
At the end of each year, the value of his car had depreciated by 15%

(b) Work out the value of Kaito's car at the end of 3 years.
Give your answer correct to the nearest JPY.

..... JPY

(3)

(Total for Question 20 is 6 marks)

21 (a) Simplify $g^6 \times g^4$

.....

(1)

(b) Simplify $(3cd^4)^2$

.....

(2)

(c) Solve the simultaneous equations

$$4x + 3y = 17$$
$$x + 2y = 5$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(3)

(Total for Question 21 is 6 marks)

22 The diagram shows a right-angled triangle.

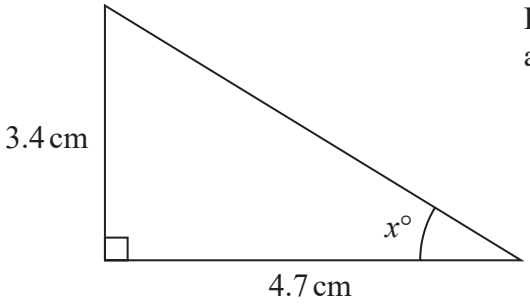


Diagram **NOT** accurately drawn

Calculate the value of x.
Give your answer correct to one decimal place.

$x =$ .....

(Total for Question 22 is 3 marks)

23 The diagram shows an isosceles triangle.

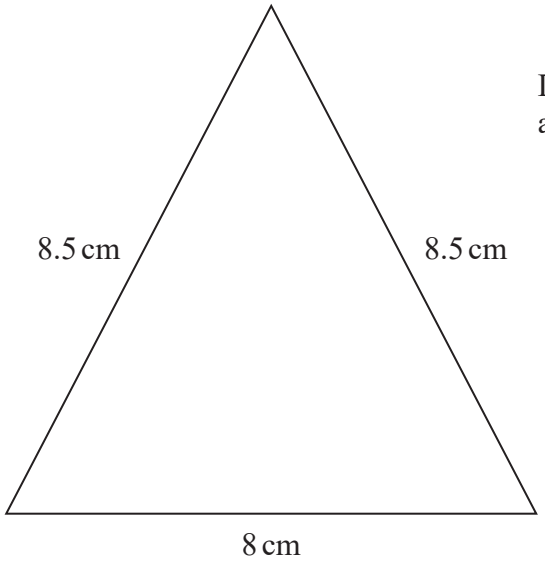


Diagram **NOT** accurately drawn

Work out the area of the triangle.

..... cm^2

(Total for Question 23 is 4 marks)

24 The diagram shows a solid cylinder with radius 3 m.

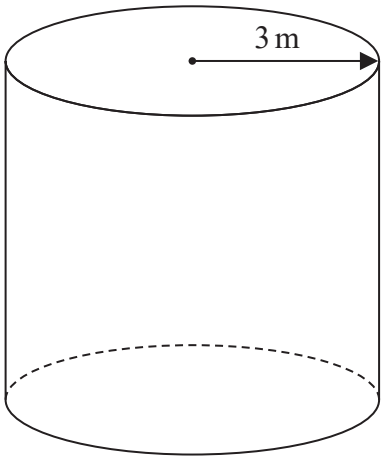


Diagram **NOT** accurately drawn

The volume of the cylinder is 72π m^3

Calculate the **total** surface area of the cylinder.
Give your answer correct to 3 significant figures.

.....m^2

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

3.1 2020 | 20201106 | Variant 2F | 4MA1_2F_rms_20201106

Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 2F

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November 2020
Publications Code 4MA1_2F_2011_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)

- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - awrt – answer which rounds to
  - eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths					
Apart from question 6d, 9b, 15, 18, 21c (where the mark scheme states otherwise) the correct answer, unless clearly obtained from an incorrect method, should be taken to imply a correct method.					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	a		26 or 64	1	B1 or both 26 and 64 with no others
	b		21 or 39	1	B1 or both 21 and 39 with no others
	c		17 or 31	1	B1 or both 17 and 31 with no others
	d		1 or 64	1	B1 or both 1 and 64 with no others
					Total 4 marks
2	a		3000	1	B1
	b		6.5	1	B1
					Total 2 marks
3	a			2	M1 for at least 2 correct tallies or frequencies
			2, 5, 4, 3, 2		A1 mark frequencies only – in either column
	b		1	1	B1 allow ft from (a)
	c		4	1	B1
					Total 4 marks
4	a		New York	1	B1 accept −15
	b		25	1	B1 accept −25
	c		−28	1	B1
					Total 3 marks

5	a		0.003, 0.035, 0.5, 0.539, 0.9	1	B1	
	b		60	1	B1	allow 60%
	c		$8\frac{4}{7}$	1	B1	oe
	d	$0.95 - 0.68$ **or** $\frac{95}{100} - \frac{68}{100}$ **or** $\frac{19}{20} - 0.68$ oe		2	M1	or $\frac{27}{100}$ or 27%
			0.27		A1	
						Total 5 marks

6	a		23	1	B1	
	b		Added 4	1	B1	accept +4, 4 more, oe, $4n - 1$ (need to know 4 and we need to add/go up oe)
	c	(23) 27, 31, 35, 39, 43, 47, 51, 55, 59, 63, 67, 71 **OR** $4n - 1 = 70$		2	M1	allow list of numbers going up in 4's up to 71 or more (allow one error)
			71		A1	
	d	No and identifying all terms in sequence are odd **OR** No and method to count on as far as 95 (or clearly showing 95) **OR** No and method to find n when term is 96 e.g. solving $4n - 1 = 96$	No with reason	1	B1	must have 'No' oe or 'is not' oe and a reason.
						Total 5 marks

7	a		(3, −1)	1	B1	
	b		(×) at (−2, −4)	1	B1	condone missing label as long on unambiguous
	c		(−1, 2)	2	B2	B1 for (−1, *a*) where $a \neq 2$ **or** (*b*, 2) where $b \neq -1$
	d		$x = 4$ drawn	1	B1	
						Total 5 marks

8		13 50	3	B3	For the correct time of 13 50 or 1.50 pm or 1.50 in the afternoon oe (B2 for 1.50 or 1.50 am or stating 2 hours 40 mins or 160 mins or intention to add all 4 times onto 11.10 B1 for intention to add all 4 times together or evidence of intention to add on 2 or 3 times to 11 10)
					Total 3 marks

9 a i		33	1	B1	accept 32 – 34
ii		15	1	B1	accept 15 – 16
b	e.g. 820 ÷ 10 × "33" (= 2706) **or** 2850 ÷ 50 × "15" (= 855)		2	M1	method to convert 820 metres to feet **or** 2850 feet to metres, allow ft from (ai) or (aii) **or** a value for 820 m to feet in range (2620 – 2740) **or** a value for 2850 feet to m in range (830 – 900)
		2850 feet supported by working		A1	2850 selected (could be unambiguously circled, underlined or stated) with correct working and figures as above to justify result, ft from part (ai) or (aii)
					Total 4 marks

10	e.g. 360 – (30 + 45 + 165) (= 120)		4	M1	method to calculate One Stop Shoes angle
	e.g. $\frac{30}{45}$′ 18 (= 12) or $\frac{30}{120}$′ 48 (= 12) oe			M1	method to calculate ABC Shoes frequency
	e.g. 165 ÷ 45 × 18 (= 66) oe **or** 165 ÷ 30 × "12" (= 66) oe **or** 165 ÷ "120" × 48 (= 66) oe **or** 18 + 48 having shown or implied that 120 + 45 = 165 and a clear intention that this is the method for Superfast Trainers (= 66)			M1	method to calculate Superfast Trainers frequency
		12, 120, 66		A1	fully correct table
					Total 4 marks

11	0.23 × 450 oe		2	M1 or for an answer of 553.5 or 346.5
		103.5		A1
				Total 2 marks

12 a		1, 3, 9	1	B1	need all three but ignore any repeats
b	15, 30, 45, 60, 75, 90, 105, 120, 135, 150, 165, 180, 195, 210 **and** 70, 140, 210 **OR** 3 × 5 **and** 2 × 5 × 7 **OR** 2 × 3 × 5 × 7 (2, 3, 5, 7) oe eg 3 × 5 × 14 (3, 5, 14) 3 | 15 | 70 5 | 5 | 70 7 | 1 | 14 2 | 1 | 2 1 | 1 5 | 15 | 70 3 | 3 | 14 14 | 1 | 14 1 | 1		2	M1	for listing at least three multiples of 15 and 70 **or** finding the prime factors of 15 and 70 (could be factors at the ends of branches of factor trees or lists 3, 5 and 2, 5, 7) or a correct calculation or the correct values for the LCM eg 2,3,5,7 or 3,5,14 oe (could be in a table)
		210		A1	
					Total 3 marks

13	eg $\frac{1}{2}\times(20+26)\times12\,(=276)$ **or** $12\times20+\frac{1}{2}\times(26-20)\times12\,(=276)$ **or** $12\times26-\frac{1}{2}\times(26-20)\times12\,(=276)$		5	M2 complete method to find the area of the shape M1 for method to find the area of a rectangle 12 × 20 (= 240) **or** 12 × 26 (=312) **or** the area of the triangle $\frac{1}{2}\times(26-20)\times12\,(=36)$
	"276" ÷ 20 (= 13.8)			M1 (indep) method to find the number of tins for their area ft any value from a calculation that includes at least two of 20, 26 & 12
	eg 3 × \$40 + 2 × \$13 (= \$146) or 14 × \$13 (= \$182) or 4 × \$40 (= \$160)			M1 method to calculate a cost for their number of tins dep on previous M1 (NB: use n × \$40 where n is the next multiple of 4 greater than the number of tins needed, divided by 4)
		146		A1 cao dep on accurate figures
				Total 5 marks

14	a		$5(5f-2)$	1	B1	
	b	$c+h=5y$ or $\frac{c}{5}=y-\frac{h}{5}$ or $\frac{c+h}{5}$		2	M1	
			$y=\frac{c+h}{5}$		A1	oe if the student puts $\frac{c+h}{5}$ on the answer line then if we have previously see $y=\frac{c+h}{5}$ we can award full marks
	c	$4x > 2-7$ oe or $x+\frac{7}{4}>\frac{2}{4}$ oe		2	M1	accept as an equation or with wrong inequality sign.
			$x > -1.25$		A1	oe allow $(-1.25, (+)\infty)$ Note: award M1A0 for an answer of -1.25 with no sign or the incorrect sign eg $x=-1.25$, $x<-1.25$
						Total 5 marks

15	$\frac{2}{5}\times\frac{20}{11}$ or eg $\frac{8}{20}\div\frac{11}{20}$		2	M1	For inverting $\frac{11}{20}$ and a clear intention to multiply or for writing both fractions correctly over the same common denominator
	$\frac{2}{5}\times\frac{20}{11}=\frac{40}{55}=\frac{8}{11}$ or $\frac{2}{\cancel{5}^{1}}\times\frac{\cancel{20}^{4}}{11}=\frac{8}{11}$ or $\frac{8}{20}\div\frac{11}{20}=\frac{8}{11}$	Clearly shown		A1	dep on M1 continued to clearly show given result
					Total 2 marks

16	a		$50 < L \leq 60$	1	B1	oe eg 50 - 60
	b	$25 \times 6 + 35 \times 26 + 45 \times 31 + 55 \times 40 + 65 \times 17$ $(150 + 910 + 1395 + 2200 + 1105)(= 5760)$			M2	For correct products using midpoints (allow one error) with intention to add. M1 for products using frequency and a consistent value within the range (allow one error) with intention to add or correct products using midpoints (allow one error) without addition
		"5760" ÷ "120"			M1	dep on M1
			48	4	A1	
						Total 5 marks

17 a	150 ÷ 6 × 14 oe		2	M1	
		350		A1	
b	630 ÷ 90 × 6 oe		2	M1	
		42		A1	
c	162 ÷ (2 + 7) × 2 oe		2	M1	
		36		A1	
				Total 6 marks	

18	*ADC* = 180 – 58 (= 122) **or** *EDF* = 122 **or** *CDE* = 58 **or** *ADF* = 58		5	M1	may be seen marked on the diagram
	e.g. *DEF* = 58 ÷ 2 **or** *DEF* = (180 – 122) ÷ 2			M1	complete method to find angle *DEF*
		29		A1	
				B2	dep on M2 for fully correct reasons for their method (B1 dep on M1 for one correct reason stated and used) e.g. Allied angles, co-interior angles, Alternate angles, Corresponding angles, Vertically opposite angles are equal (or Vertically opposite angles are equal), Angles on a straight line add up to 180°(or angles on a straight line add to 180°), Sum of two angles in a triangle are equal to opposite exterior angle, Angles in a triangle add up to 180°(or Angles in a triangle add up to 180°), Base angles in an isosceles triangle Angles in a quadrilateral add up to 360. (accept "4-sided shape"or parallelogram) Opposite angles of a parallelogram are equal
				Total 5 marks	

19	$76 \div (5 + 2 - 3)$ (= 19) $5x + 2x - 3x = 76$, $x = 76 \div 4$ (=19) oe		4	M1	
	"19" × 3 (= 57)			M1	
	"57" – 48.5(0)			M1	
		8.5(0)		A1	
					Total 4 marks

20	a	1.04 × 3 130 000 oe			3	M2	complete method to increase salary by 4% M1 for 0.04 × 3 130 000 oe (= 125 200)	
				3 255 200		A1		
	b	for 0.15 × 750 000 oe (=112 500) **or** 0.85 × 750 000 oe (637 500)	**OR**		3	M1	For method to find depreciation for 1 year or value after 1 year	**OR** M2 for 750 000 × 0.85^3(= 460 593.75) **or** 750 000 × 0.85^4 **(=** 391 504.69)
		0.85 × "637 500" (= 541 875) oe 0.85 × "541 875" (= 460 593.75) oe	750 000 × 0.85^3			M1	for completing method	(M1 for 750 000 × 0.85^2 **(=** 541 875)
				460 594		A1	accept 460 593 – 460 594	
							SC: if no other marks gained award M1 for 0.55 × 750 000 oe **(=** 412 500) **or** 0.45 × 750 000 oe **(=** 337 500) accept (1 – 0.15) as equivalent to 0.85 throughout	
								Total 6 marks

21	a			g^{10}	1	B1
	b			$9c^2d^8$	2	B2 B1 for 2 out of 3 terms correct as part of a product
	c	eg $4x + 3y = 17$ $-\ 4x + 8y = 20$ **or** eg $4(5 - 2y) + 3y = 17$	eg $8x + 6y = 34$ $-\ 3x + 6y = 15$ **or** eg $4x + 3 \times ½(5 - x) = 17$		3	M1 Correct method to eliminate x or y: coefficients of x or y the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or** writing x or y in terms of the other variable and correctly substituting
		eg $4x + 3 \times 0.6 = 17$ **or** $x + 2 \times 0.6 = 5$	eg $4 \times 3.8 + 3y = 17$ **or** $3.8 + 2y = 5$			M1 (dep) correct method to find second variable – could start process again or use substitution
				$x = 3.8$ $y = 0.6$		A1 oe for both solutions dep on first M1
						Total 6 marks

22	$\tan x = \frac{3.4}{4.7}$ oe eg $\cos x = \frac{4.7}{\sqrt{3.4^2 + 4.7^2}}$			M1 or $\sin x = \frac{3.4\sin 90}{\sqrt{3.4^2 + 4.7^2}}$ oe
	$(x =) \tan^{-1}\left(\frac{3.4}{4.7}\right)$ oe eg $(x =) \cos^{-1}\left(\frac{4.7}{\sqrt{3.4^2 + 4.7^2}}\right)$			M1 or $(x =) \sin^{-1}\left(\frac{3.4\sin 90}{\sqrt{3.4^2 + 4.7^2}}\right)$ oe
		35.9	3	A1 accept 35.7 - 36.1
				Total 3 marks

23	$8.5^2 - (8 \div 2)^2$ (= 56.25) **or** $\cos x = \frac{4}{8.5}$		4	M1 **or** eg $\cos A = \frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}$
	$\sqrt{"56.25"}$ (= 7.5) **or** $x = \cos^{-1}\left(\frac{4}{8.5}\right)$ (= 61.927...)			M1 **or** eg $(A =) \cos^{-1}\left(\frac{8^2 + 8.5^2 - 8.5^2}{2 \times 8 \times 8.5}\right)$ (61.927...) (other angle = 56.144...)
	8 × "7.5" ÷ 2 oe **or** 0.5 × 8 × 8.5 × sin "61.927..."			M1 **or** eg 0.5 × 8.5 × 8 × sin61.927...oe
		30		A1
				Total 4 marks

24	$\pi \times 3^2 \times h = 72\pi$ oe		5	M1	Allow use of 3.14... or $\frac{22}{7}$ for π and use of 226... for 72π
	$h = 72\pi \div (\pi \times 3^2)$ oe **or** $h = 8$			M1	method to isolate h (may be seen in several stages)
	$2 \times \pi \times 3^2$ (= 18π or 56.54...) **or** $2 \times \pi \times 3 \times$ "8" oe (= 48π or 150 - 151)			M1	method to find the area of the two circles **or** curved surface area – use of their h, dep on M1 (NB may get this mark for area of 2 circles with no previous marks awarded)
	$2 \times \pi \times 3^2 + 2 \times \pi \times 3 \times$ "8" oe (= 66π)			M1	complete method to find the total surface area ft their h dep on 1st M1, including intention to add, to find the total surface area
		207		A1	accept 207-208
					Total 5 marks

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Centre Number | | | | | |

Candidate Number | | | | |

Thursday 4 June 2020

Morning (Time: 2 hours) | Paper Reference **4MA1/2FR**

Mathematics A

Paper 2FR

Foundation Tier

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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

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.*

Advice

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

P62656A

1/1/1/1/

P 6 2 6 5 6 A 0 1 2 4

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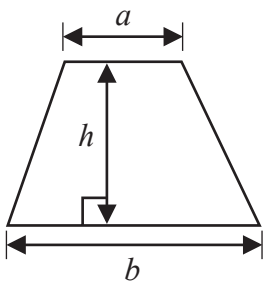
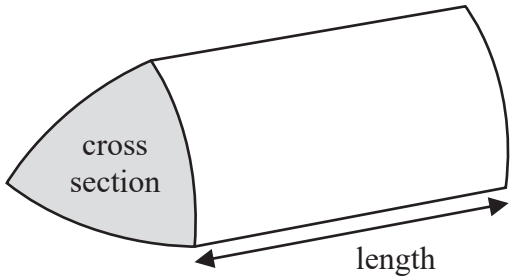
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

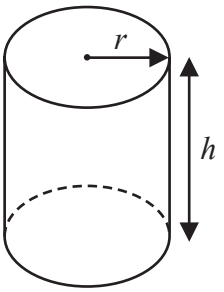


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY SIX questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows the depth of six ocean trenches.

Trench	Depth (metres)
Diamantina	8047
Eurasian Basin	4437
Philippine	10 540
Puerto Rico	8594
South Sandwich	8458
Tonga	10 882

(a) Which of these trenches has the greatest depth?

.....

(1)

(b) Write down the value of the 5 in the number 8594

.....

(1)

(c) Write the number 4437 in words.

.....

(1)

When written correct to the nearest hundred, one of the numbers in the table is 8500

(d) What is this number?

.....

(1)

The Mariana Trench is 2864 metres deeper than the Diamantina Trench.

(e) Work out the depth of the Mariana Trench.

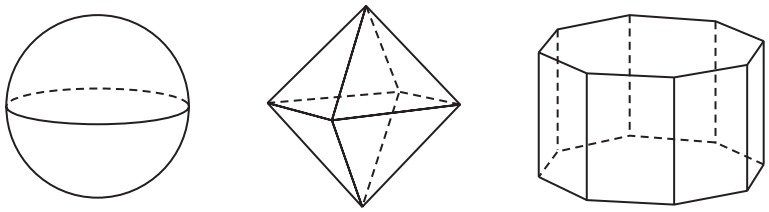
..... metres

(2)

(Total for Question 1 is 6 marks)

2 The diagram shows some 3-D shapes.

Shape A **Shape B** **Shape C**



(a) What is the mathematical name of shape **A**?

.....

(1)

(b) How many edges has shape **B**?

.....

(1)

(c) How many faces has shape **C**?

.....

(1)

(Total for Question 2 is 3 marks)

3 Here are the first five terms of a number sequence.

1 3 9 27 81

(a) Find the next term of this sequence.

.....

(1)

(b) Explain how you found this term.

.....

.....

(1)

The 9th term of this number sequence is 6561

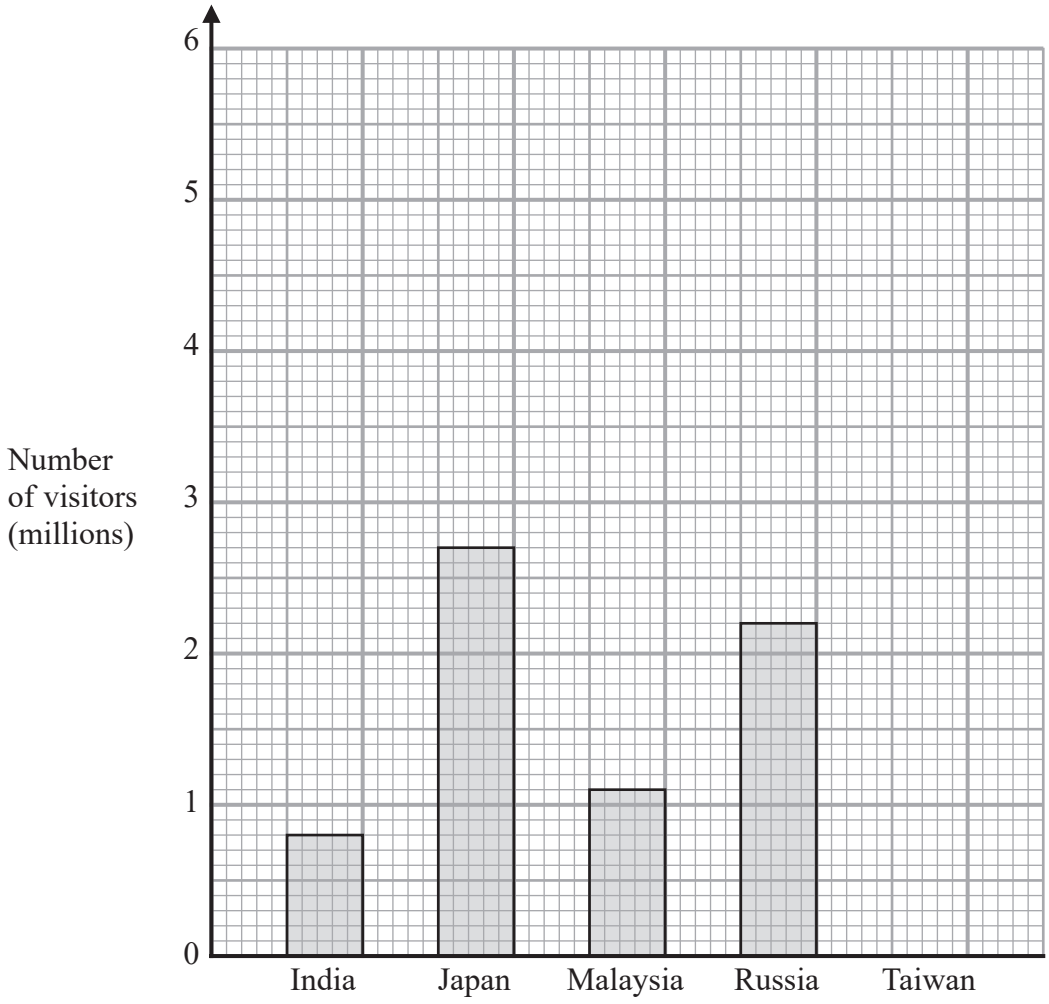
(c) Find the 10th term of this sequence.

.....

(1)

(Total for Question 3 is 3 marks)

4 The bar chart shows information about the number of visitors to China from each of four countries in 2015



(a) Write down the number of visitors from Japan.

..... million

(1)

(b) From which country were there 1.1 million visitors?

.....

(1)

The number of visitors from Taiwan was 5.4 million.

(c) Draw a bar on the bar chart to show this information.

(1)

The number of visitors from one country was twice the number of visitors from Malaysia.

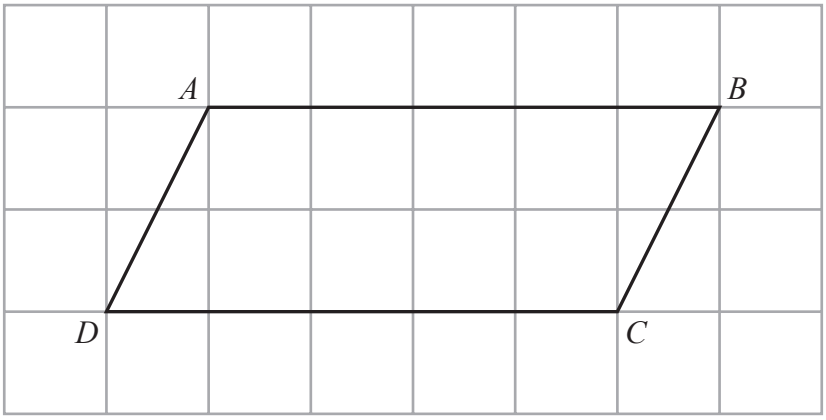
(d) Write down the name of this country.

.....

(1)

(Total for Question 4 is 4 marks)

5 The diagram shows a quadrilateral *ABCD* drawn on a square grid.



(a) Measure the length of *BC*.

..... cm

(1)

(b) Write down the mathematical name of quadrilateral *ABCD*.

.....

(1)

(c) Write down the order of rotational symmetry of quadrilateral *ABCD*.

.....

(1)

(d) On the diagram, mark an obtuse angle with the letter *x*.

(1)

Here is a diagram of a trapezium.

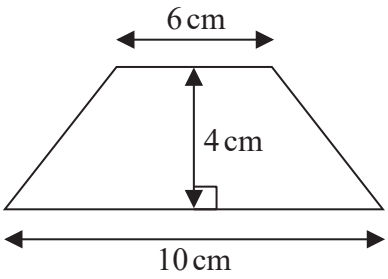


Diagram **NOT** accurately drawn

(e) Work out the area of the trapezium.

..... cm^2

(2)

(Total for Question 5 is 6 marks)

6 There are 32 children in a nursery.

Sandeep buys 5 boxes of balloons.
There are 25 balloons in each box.

Sandeep shares the balloons equally between the 32 children so that each child gets as many balloons as possible.

Work out the number of balloons that are not shared between the 32 children.

.....

(Total for Question 6 is 4 marks)

7 The diagram shows a trapezium $ABCD$ in which AB and DC are parallel.

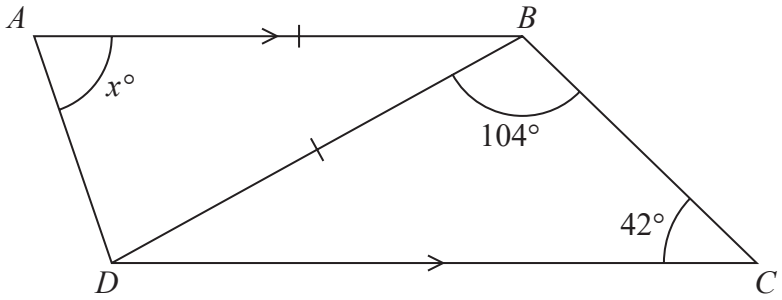


Diagram **NOT** accurately drawn

$AB = DB$

Work out the value of x.
Give a reason for each stage of your working.

$x =$ .....

(Total for Question 7 is 4 marks)

8 The following rule is used to work out the total cost, in euros, of hiring a room.

Total cost = 9 euros for each hour plus 20 euros

Paolo hires the room for 5 hours.

(a) Work out the total cost.

..... euros

(2)

Agathe also hires the room.
The total cost is 164 euros.

(b) For how many hours does Agathe hire the room?

..... hours

(3)

The total cost of hiring the room for n hours is T euros.

(c) Write down a formula for T in terms of n.

.....

(2)

(Total for Question 8 is 7 marks)

9 (a) Work out $16 \div 4 + 3 \times 8$

.....

(1)

(b) Find the cube root of 5832

.....

(1)

(c) Write 85% as a decimal.

.....

(1)

(d) Write these fractions in order of size.
Start with the smallest fraction.

$$\frac{3}{4} \qquad \frac{2}{5} \qquad \frac{7}{15} \qquad \frac{2}{3}$$

.....

(2)

(e) Write 36 as a fraction of 96
Give your fraction in its simplest form.

.....

(2)

(Total for Question 9 is 7 marks)

10 Freda is playing a car racing game on her computer.

She sets up her computer so that her car completes each lap in the same number of seconds.
Her car completes 3 laps in 72 seconds.

To win the game, Freda has to complete 68 laps in less than half an hour.

Does Freda win the game?
Give a reason for your answer.

(Total for Question 10 is 4 marks)

11 Show that $\frac{5}{12} + \frac{3}{8} = \frac{19}{24}$

(Total for Question 11 is 2 marks)

12 (a) Expand $4(m + 2)$

.....

(1)

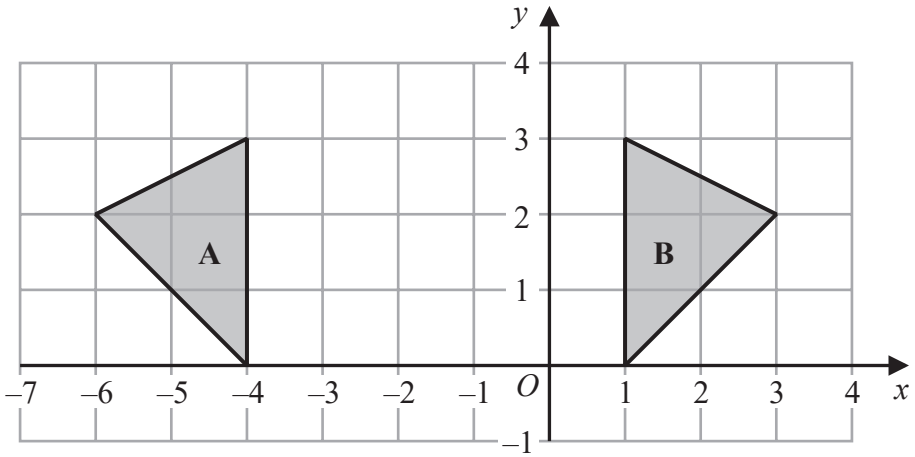
(b) Solve $2x + 5 = -19$

$x =$.....

(2)

(Total for Question 12 is 3 marks)

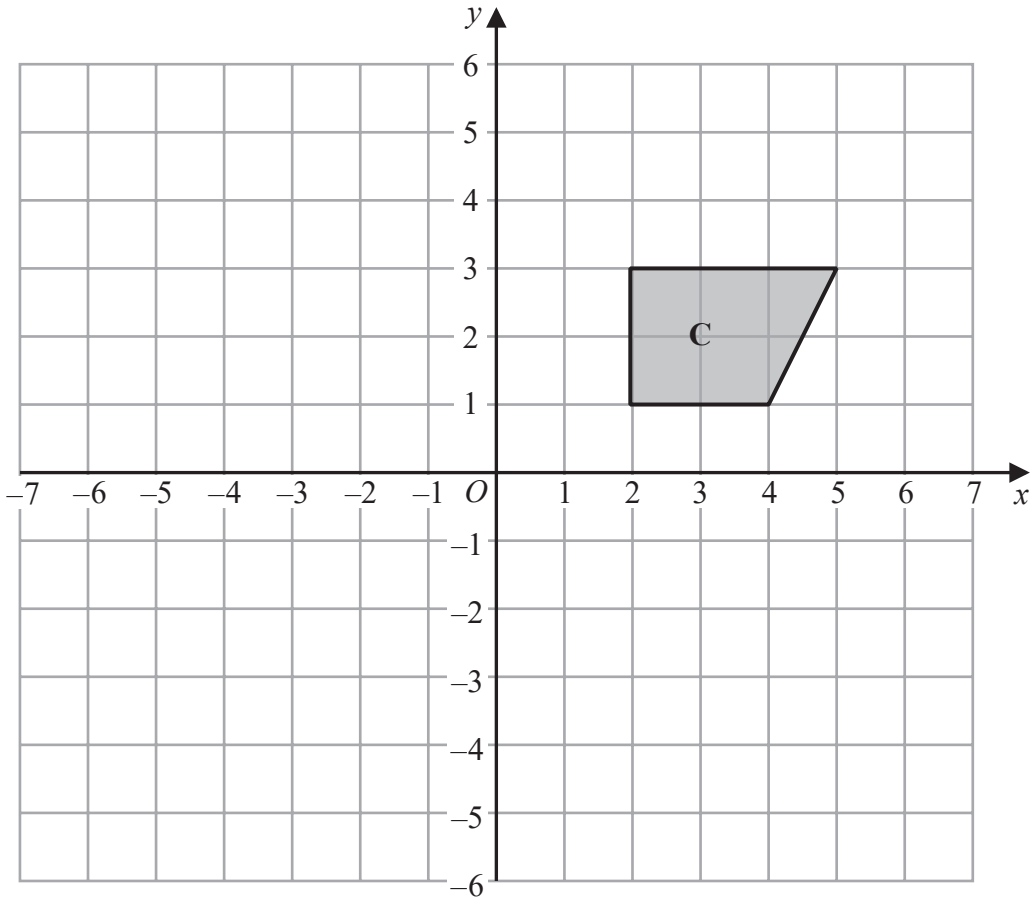
13



On the grid above, triangle **A** is the reflection of triangle **B** in the mirror line M.

(a) On the grid, draw the mirror line M.
Label the line M.

(1)

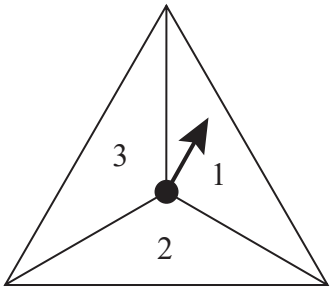


(b) On the grid above, rotate the shaded shape **C** 90° anticlockwise about the point with coordinates (0, 0)

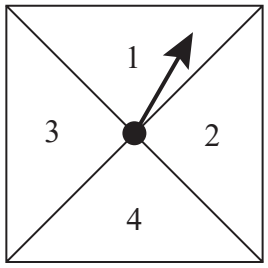
(2)

(Total for Question 13 is 3 marks)

14 Here are two fair spinners.



Spinner **A**



Spinner **B**

Chanthira spins each spinner once.

She adds together the number that spinner **A** lands on and the number that spinner **B** lands on to find the score.

(a) Complete the table to show all possible scores.
Three scores have been done for you.

Spinner **A** \ Spinner **B**	**1**	**2**	**3**	**4**
1	2	3		
2	3			
3				

(2)

(b) Find the probability that the score will be 4 or less.

.....

(2)

Chanthira now spins both spinners together 84 times.

(c) Find an estimate for the number of times that spinner **A** and spinner **B** land on the same number.

.....

(2)

(Total for Question 14 is 6 marks)

15 Write 880 as a product of powers of its prime factors.
Show your working clearly.

.....

(Total for Question 15 is 3 marks)

16 (a) Write 2.46×10^6 as an ordinary number.

.....

(1)

(b) Write 0.000 74 in standard form.

.....

(1)

(c) Work out $(5.6 \times 10^6) + (2.3 \times 10^5)$

.....

(2)

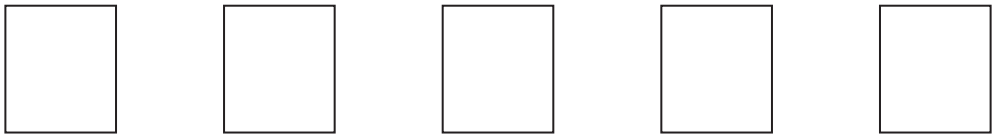
(Total for Question 16 is 4 marks)

17 Alexa has five cards.
Each card has a number on it.

The table gives information about the numbers on the five cards.

Total	Median	Mode	Range
45	8	5	10

Using the information in the table, complete each card by writing its number on it.



(Total for Question 17 is 3 marks)

18 The length of a book is 33.8 cm, correct to one decimal place.

(a) Write down the lower bound of the length of the book.

..... cm

(1)

(b) Write down the upper bound of the length of the book.

..... cm

(1)

(Total for Question 18 is 2 marks)

19 Nav has worked out $\frac{68.3 \times 42.8}{0.021}$ on his calculator.

His answer is 139 201.9048

Without using a calculator and using suitable approximations, check that his answer is sensible.
Show your working clearly.

(Total for Question 19 is 2 marks)

20 Markus makes a steel framework.
The framework is in the shape of the right-angled triangle ABC shown in the diagram.

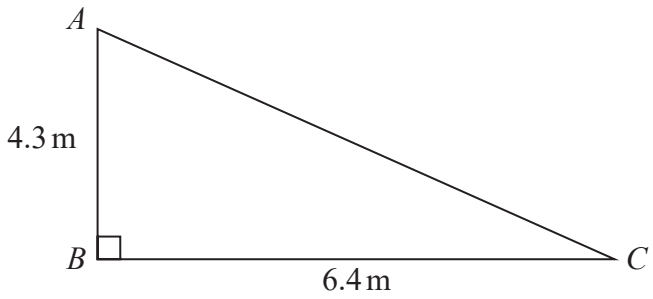


Diagram **NOT** accurately drawn

The steel that Markus uses costs \$22 per metre.
The steel can **only** be bought in a length that is a whole number of metres.

Work out the total cost of the steel that Markus buys in order to make the framework.

\$.....

(Total for Question 20 is 4 marks)

21 Alison buys 2 boxes of strawberries, box **A** and box **B**.

Box **A** contains 15 strawberries.
The strawberries in box **A** have a mean weight of 24 grams.

Box **B** contains 25 strawberries.
The strawberries in box **B** have a mean weight of 18 grams.

Alison puts all 40 strawberries into a bowl.
Work out the mean weight of the 40 strawberries.

..... grams

(Total for Question 21 is 3 marks)

22 (a) Factorise $x^2 - x - 42$

.....

(2)

(b) Solve the inequality $3x + 15 < 8x + 3$

Show clear algebraic working.

.....

(3)

(Total for Question 22 is 5 marks)

23 Given that $150^x = 1$

(a) write down the value of x.

$x =$.....

(1)

Given that $3^{-8} \div 3^{-6} = 3^n$

(b) find the value of n.

$n =$.....

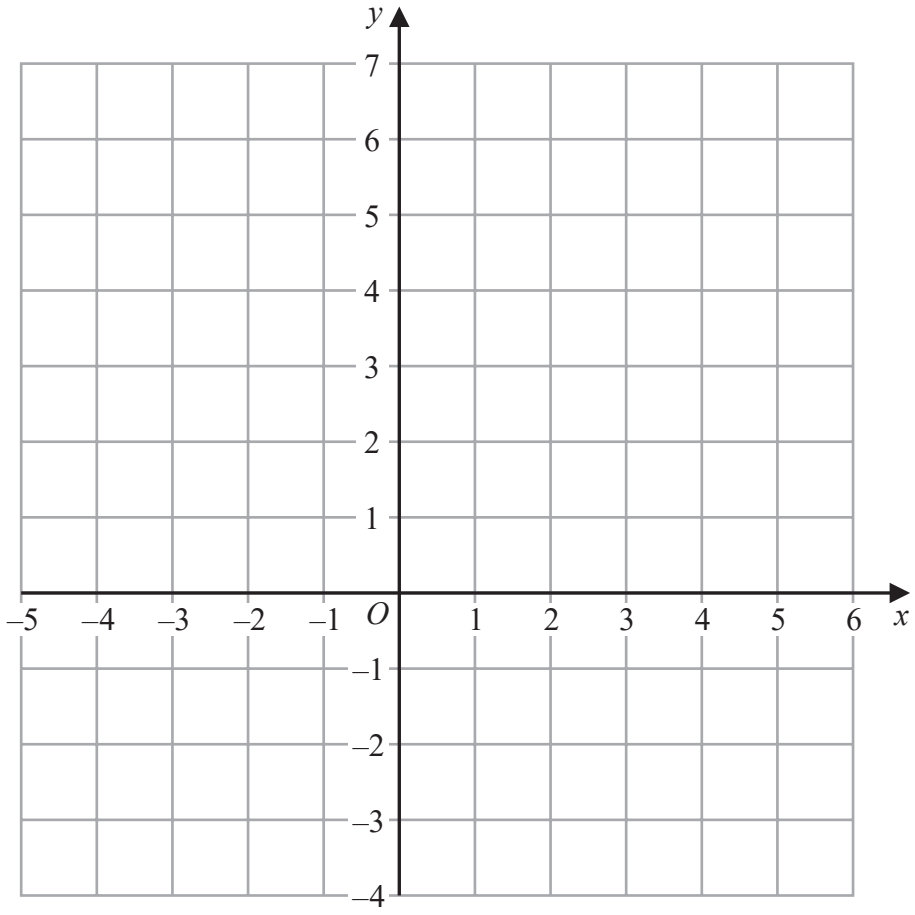
(1)

(Total for Question 23 is 2 marks)

24 Show, by shading on the grid, the region that satisfies all three of the inequalities

$x \leqslant 4$ and $y \geqslant -2$ and $y \leqslant x$

Label the region **R**.



(Total for Question 24 is 3 marks)

25 Find the gradient of the straight line with equation $5x + 2y = 7$

.....

(Total for Question 25 is 2 marks)

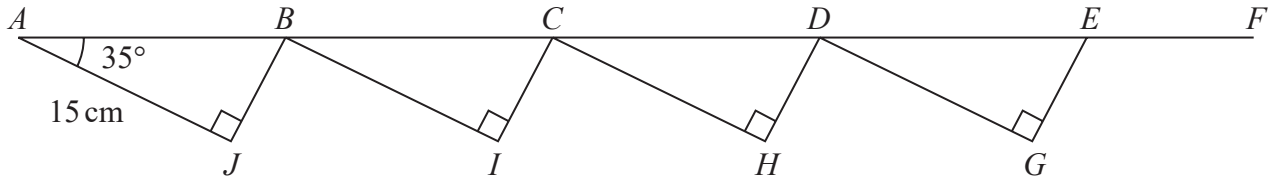
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

26 The diagram shows four congruent right-angled triangles *ABJ*, *BCI*, *CDH* and *DEG*.
The diagram also shows the straight line *ABCDEF*.

Diagram **NOT** accurately drawn



AJ = 15 cm
Angle *BAJ* = 35°

AF = 80 cm

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

..... cm

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
Mathematics A (4MA1)
Paper 2FR

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November 2020
Publications Code 4MA1_2FR_2011_MS

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme.
  Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

- **Types of mark**
  - M marks: method marks
  - A marks: accuracy marks
  - B marks: unconditional accuracy marks (independent of M marks)

- **Abbreviations**
  - cao – correct answer only
  - ft – follow through
  - isw – ignore subsequent working
  - SC - special case
  - oe – or equivalent (and appropriate)
  - dep – dependent
  - indep – independent
  - awrt – answer which rounds to
  - eeoo – each error or omission

- **No working**

  If no working is shown then correct answers normally score full marks
  If no working is shown then incorrect (even though nearly correct) answers score no marks.

- **With working**

  If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
  If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks.
  If a candidate misreads a number from the question. Eg. Uses 252 instead of 255; method marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review. If there is a choice of methods shown, mark the method that leads to the answer on the answer line; where no answer is given on the answer line, award the lowest mark from the methods shown.
  If there is no answer on the answer line then check the working for an obvious answer.

- **Ignoring subsequent work**

  It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: eg. Incorrect cancelling of a fraction that would otherwise be correct.
  It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect eg algebra.
  Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

- **Parts of questions**

  Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded to another.

International GCSE Maths					
Apart from questions 11, 15, 19 and 22b the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.					
Q		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		Tonga	1	B1 cao
	(b)		5 hundred(s)	1	B1 for 5 hundred(s) or 500
	(c)		four thousand, four hundred and thirty seven	1	B1 all numbers must be as words
	(d)		8458	1	B1 cao
	(e)	8047 + 2864		2	M1 for 'any value from table' + 2864
			10 911		A1 cao
					Total 6 marks

2	(a)		sphere	1	B1
	(b)		12	1	B1 cao
	(c)		10	1	B1 cao
					Total 3 marks

3	(a)		243	1	B1	cao
	(b)		Multiplying previous term by 3	1	B1	for multiplying previous term by 3 oe "×3" or 81×3
	(c)		19 683	1	B1	cao
						Total 3 marks

4	(a)		2.7	1	B1	condone 2.7 million
	(b)		Malaysia	1	B1	cao
	(c)		Correct bar drawn	1	B1	for correct bar at a height of 5.4 (within half small square) allow any bar width or location (no gap required) condone stick at correct height.
	(d)		Russia	1	B1	cao
						Total 4 marks

5	(a)		3.0 – 3.2	1	B1	for in the range 3.0 – 3.2
	(b)		Parallelogram	1	B1	allow trapezium
	(c)		2	1	B1	cao
	(d)		Correctly labelled	1	B1	Angle *DAB* or angle *DCB* or both labelled
	(e)	$\frac{1}{2}(6+10)\times 4$		2	M1	for correct application of formula allow triangle method
			32		A1	cao
						Total 6 marks

6	5×25 (= 125)		4	M1 total number of balloons
	'125' ÷ 32 (= 3.9….)			M1
	'125' – (32 × 3) or 125 – 96 **or** $3\frac{29}{32}$			M1
		29		A1
				Total 4 marks

Alternative Mark Scheme for Q6				
6	5×25 (= 125)		4	M1
	32×3 (= 96) **or** 32×4 (= 128)			M1
	'125' – (32 × 3) or '125' – 96			M1
		29		A1
				Total 4 marks

7	$180° - (104° + 42°)$ (= 34°) or $\frac{180° - '34°'}{2}$		4	M1 for one correct stage
		73		A1 for 73
	• Angles in a triangle sum to 180° or (angles in a triangle sum to 180°) • Angle *BDC* and angle *DBA* are alternate angles • Base angles in an isosceles triangle are equal **or** (Allied / co-interior angles add up to 180°)	correct reasons		B2 dep fully correct method. for all correct reasons for the method used NB allied angles may not be needed if using *ABD* sum to 180° (B1 dep M1 for one correct reason)
				Total 4 marks

8 (a)	20 + 45 or 20 + 9 × 5		2	M1	
		65		A1	
(b)	164 – 20 (= 144)		3	M1	
	'144' ÷ 9 (= 16)			M1	
		16		A1	cao
(c)			2	M1	for $T = an + 20$ or $T = 9n + k$ or $9n + 20$
		$T = 9n + 20$		A1	for $T = 20 + 9n$ or $T = 9n + 20$
					Total 7 marks

9 (a)		28	1	B1	cao
(b)		18	1	B1	cao
(c)		0.85	1	B1	cao
(d)	$\frac{45}{60}, \frac{24}{60}, \frac{28}{60}, \frac{40}{60}$ or 0.75, 0.4, 0.466…, 0.666… or 75%, 40%, 46.6%, 66.6%		2	M1	for a method to compare the fractions If M0, award B1 for any three of these fractions in the correct order or for all fractions (or dec or perc) in correct reverse order
		$\frac{2}{5}, \frac{7}{15}, \frac{2}{3}, \frac{3}{4}$		A1	allow answers in any form (dec or perc)
(e)	$\frac{36}{96}$ oe		2	M1	for fraction or for partial simplification.
		$\frac{3}{8}$		A1	cao correct answer scores full marks
					Total 7 marks

10	$72 \div 3\ (= 24)$ or $\frac{x}{68} = \frac{72}{3}$		4	M1
	'24' × 68 (= 1632) or $(x =)\frac{72}{3} \times 68$ oe			M1
	'1632' ÷ 60 (= 27.2) **or** 30 × 60 (= 1800) or '1632' ÷ 3600 $(= \frac{34}{75} = 0.453(333...))$			M1
		Yes with correct figures		A1 Yes and 27.2 **or** (1632 and 1800) seen or Yes and 0.453 oe seen
				Total 4 marks

Alternative Mark Scheme for Q10 (calculation in minutes)				
10	72 ÷ 60 (= 1.2)		4	M1
	'1.2' ÷ 3 (= 0.4)			M1
	68 × '0.4' (= 27.2)			M1
		Yes, with correct figures		A1 Yes and 27.2 seen
				Total 4 marks

11	$\frac{10}{24}+\frac{9}{24}$ or $\frac{10n}{24n}+\frac{9n}{24n}$ or eg $\frac{40+36}{96}$ $\left(=\frac{76}{96}\right)$		2	M1	for writing a sum, and each fraction with a common denominator, eg $\frac{10}{24}+\frac{9}{24}$
	$\frac{10}{24}+\frac{9}{24}=\frac{19}{24}$ or eg $\frac{40+36}{96}=\frac{76}{96}=\frac{19}{24}$	clearly shown		A1	dep on M1 continued to clearly show given result
					Total 2 marks

12	(a)		$4m + 8$	1	B1	do not isw further incorrect working
	(b)	$2x = -19 - 5$ **or** $2x = -24$ **or** $x=\frac{-19-5}{2}$ or $x=\frac{-24}{2}$		2	M1	
			-12		A1	cao
						Total 3 marks

13	(a)		Correct mirror line $x = -1.5$	1	B1	Correct line drawn at $x = -1.5$ allow freehand with intention to draw at -1.5
	(b)		Shape drawn	2	B2 (B1	for correct shape with vertices at $(-1,2)$, $(-1, 4)$, $(-3, 2)$ and $(-3, 5)$ for a correct orientation or 90° clockwise turn about correct point)
						Total 3 marks

14	(a)			**Spinner B**				Correct values	2	B2 (B1	for all 9 correct values 5 or 6 or 7 or 8 correct values)
				1	**2**	**3**	**4**				
		Spinner A	**1**	(2)	(3)	4	5				
			2	(3)	4	5	6				
			3	4	5	6	7				
	(b)								2	M1	for $\frac{6}{m}$ where $m > 6$ or $\frac{n}{12}$ where $n < 12$
								$\frac{6}{12}$		A1ft	$\frac{"6"}{12}$ oe ft their table. isw incorrect cancelling.
	(c)	$\frac{'3'}{12} \times 84$							2	M1	allow "a fraction" × 84 fraction cannot be zero or improper
								21		A1	cao
											Total 6 marks

15			3	M1	for continual prime factorisation (at least two consecutive steps correct) or at least two stages of a factor tree, or table, correct.
				M1	for a fully correct factor tree or a list (2,2,2,2,5,11) or $2 \times 2 \times 2 \times 2 \times 5 \times 11$
		$2^4 \times 5 \times 11$		A1	dep M2 for $2^4 \times 5 \times 11$ (with working seen)
					Total 3 marks

16	(a)		2 460 000	1	B1	accept 2,460,000 or 246 0000
	(b)		7.4×10^{-4}	1	B1	
	(c)			2	M1	for correct value not in standard form e.g. 58.3×10^5 or 583×10^4 or 0.583×10^7 oe
			5 830 000		A1	5 830 000 or 5.83×10^6 do not isw.
						Total 4 marks

17			3	M1	for one of - 5 numbers with a median of 8 - 5 numbers with a mode of 5 - 5 numbers with a range of 10 - 5 numbers with a sum of 45
				M1	for two of - 5 numbers with a median of 8 - 5 numbers with a mode of 5 - 5 numbers with a range of 10 - 5 numbers with a sum of 45
		5, 5, 8, 12, 15		A1	Note: The numbers can be in any order
					Total 3 marks

18 (a)		33.75	1	B1	oe eg 33.750
(b)		33.85	1	B1	allow $33.84\dot{9}$ or 33.849^{r} or "33.8499…" do NOT allow 33.879 without indication of recurring "9"
					Total 2 marks

19	$\frac{70\times40}{0.02}$ or $\frac{68\times40}{0.02}$ or $\frac{70\times43}{0.02}$ or $\frac{68\times43}{0.02}$		2	M1	for a correct expression using a suitable approximation. 0.02 is the only acceptable denominator.
	$\frac{70\times40}{0.02}=140\,000$ **or** $\frac{68\times40}{0.02}=\frac{2720}{0.02}=136\,000$ **or** $\frac{70\times43}{0.02}=\frac{3010}{0.02}=150\,500$ **or** $\frac{68\times43}{0.02}=\frac{2924}{0.02}=146\,200$	Correct figures		A1	If student says 'no' then do not award the A mark Intermediate step required unless rounded to 1sf
					Total 2 marks

20	$4.3^2 + 6.4^2$ or 59.45		4	M1	for squaring and adding
	$\sqrt{4.3^2 + 6.4^2}$ or $\sqrt{59.45}$ or 7.71(038…) or 7.7			M1	dep 1st M1 for square rooting
	e.g ('7.71' + 4.3 + 6.4) × 22 or '18.4' × 22 or ('8' + 4.3 + 6.4) × 22 or '18.7' × 22 or '19' × 22 or '20' × 22			M1	dep 2nd M1 for a non-rounded perimeter × 22 or 18 × 22 or 19 × 22 accept 20 × 22
		\$418		A1	answer must come from 19
					Total 4 marks

21	15 × 24 (= 360) **or** 25 × 18 (= 450)		3	M1	may be implied by 810 seen
	$\frac{'360'+'450'}{40}$ $(=\frac{810}{40})$			M1	dep on M1
		20.25 oe		A1	for 20.25 accept 20.3 (allow 20 from correct working)
					Total 3 marks

22 (a)			2	M1	for $(x \pm 6)(x \pm 7)$
		$(x + 6)(x - 7)$		A1	for $(x + 6)(x - 7)$ or $(x - 7)(x + 6)$ isw roots given if candidate solves the quadratic = 0
(b)	$3x - 8x < 3 - 15$ or $15 - 3 < 8x - 3x$		3	M1	accept as equation or with the wrong inequality sign.
	$-5x < -12$ or $12 < 5x$			M1	accept as equation or with the wrong inequality sign.
		$x > 2.4$		A1	Accept $2.4 < x$ or $x > \frac{12}{5}$ oe allow $(-\infty, 2.4)$ award M1 M1 A0 for 2.4 with = sign or no inequality or incorrect inequality sign.
					Total 5 marks

23 (a)		0	1	B1	condone 150^0
(b)		-2	1	B1	condone 3^{-2}
					Total 2 marks

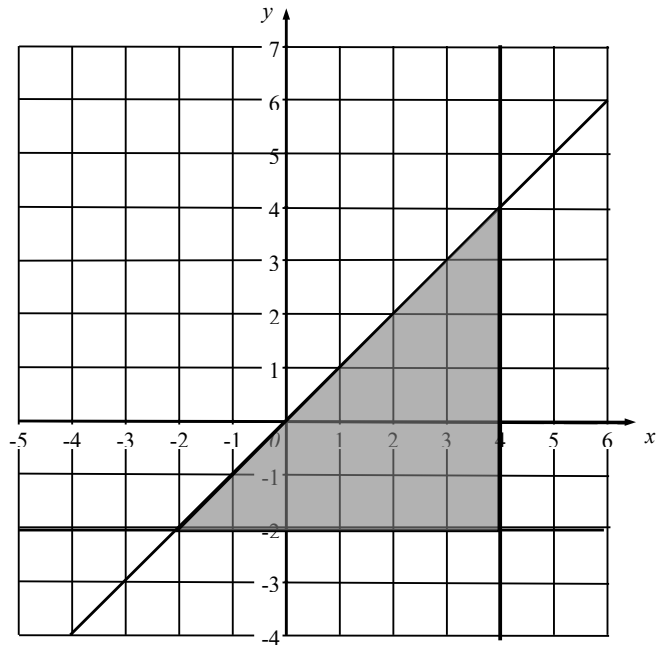
24	See appendix 1		3	M1	for $y = x$ correctly drawn
				M1	for $x = 4$ **and** $y = -2$ correctly drawn
		Correct region identified		A1	for correct region identified region may be shaded or left unshaded Condone missing label if region is clear and no contradictory labels
					Total 3 marks

25	$y = \frac{7-5x}{2}$ or $y = \frac{7}{2} - \frac{5}{2}x$ or $y = 3.5 - 2.5x$ or $2y = 7 - 5x$ oe		2	M1	for making y or $2y$ the subject
		−2.5		A1	for $-\frac{5}{2}$ or −2.5
					Total 2 marks

26	$\cos 35° = \frac{15}{AB}$ or $\sin 55° = \frac{15}{AB}$		5	M1	
	$(AB =) \frac{15}{\cos 35°}$ (=18.3) or $(AB =) \frac{15}{\sin 55°}$ (=18.3)			M1	NB 18.3(116...)
	'18.3' × 4 (= 73.2)			M1	dep 1st M1
	80 − '18.3' × 4 or 80 – '73.2'			M1	
		6.75		A1	accept 6.75 – 6.8
					Total 5 marks

Alternative Mark Scheme for Q26 [do not mix and match with above MS]					
26	15 × 4 (= 60)		5	M1	
	$\cos 35° = \frac{'60'}{AE}$ or $\sin 55° = \frac{'60'}{AE}$			M1	
	$(AE =) \frac{'60'}{\cos 35°}$ (= 73.2) or $(AE =) \frac{'60'}{\sin 55°}$ (= 73.2)			M1	dep 1st M1
	80 – '73.2'			M1	
		6.75		A1	accept 6.75 – 6.8
					Total 5 marks

Appendix 1



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A Topical Questions Tracker

A.1 Numbers and the number system

A.1.1 Integers

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4MA1_2F_que_20200305 Question: 11 b QP Page: 14 MS Page: 37
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4MA1_2F_que_20200305 Question: 11 d QP Page: 14 MS Page: 37
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4MA1_2F_que_20201106 Question: 4 a QP Page: 96 MS Page: 121
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4MA1_2FR_que_20201106 Question: 1 a QP Page: 138 MS Page: 165
4MA1_2FR_que_20201106 Question: 1 b QP Page: 138 MS Page: 165
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4MA1_2FR_que_20201106 Question: 1 e QP Page: 138 MS Page: 165
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A.1.2 Fractions

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4MA1_2FR_que_20200305 Question: 4 d QP Page: 57 MS Page: 82
4MA1_2FR_que_20200305 Question: 14 a QP Page: 66 MS Page: 85
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4MA1_2F_que_20201106 Question: 15 QP Page: 105 MS Page: 128
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4MA1_2FR_que_20201106 Question: 9 e QP Page: 145 MS Page: 168
4MA1_2FR_que_20201106 Question: 11 QP Page: 147 MS Page: 170

A.1.3 Decimals

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4MA1_2F_que_20200305 Question: 2 c QP Page: 6 MS Page: 33
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4MA1_2F_que_20201106 Question: 5 a QP Page: 97 MS Page: 122
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A.1.4 Powers and roots

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4MA1_2FR_que_20200305 Question: 12 c QP Page: 64 MS Page: 84
4MA1_2FR_que_20200305 Question: 12 d QP Page: 64 MS Page: 84
4MA1_2F_que_20201106 Question: 1 d QP Page: 94 MS Page: 121
4MA1_2F_que_20201106 Question: 12 b QP Page: 103 MS Page: 125
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A.1.5 Set language and notation

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A.1.6 Percentages

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4MA1_2FR_que_20200305 Question: 13 QP Page: 65 MS Page: 84
4MA1_2FR_que_20200305 Question: 14 c QP Page: 66 MS Page: 85
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4MA1_2F_que_20201106 Question: 11 QP Page: 103 MS Page: 125
4MA1_2F_que_20201106 Question: 20 a QP Page: 111 MS Page: 130
4MA1_2F_que_20201106 Question: 20 b QP Page: 111 MS Page: 130
4MA1_2FR_que_20201106 Question: 9 c QP Page: 145 MS Page: 168

A.1.7 Ratio and proportion

4MA1_2FR_que_20200305 Question: 14 b QP Page: 66 MS Page: 85
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4MA1_2F_que_20201106 Question: 17 b QP Page: 107 MS Page: 129
4MA1_2F_que_20201106 Question: 17 c QP Page: 108 MS Page: 129
4MA1_2F_que_20201106 Question: 19 QP Page: 110 MS Page: 130
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A.1.8 Degree of accuracy

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A.1.9 Standard form

4MA1_2FR_que_20200305 Question: 24 a QP Page: 73 MS Page: 87
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4MA1_2FR_que_20201106 Question: 16 b QP Page: 151 MS Page: 172
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A.1.10 Applying number

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4MA1_2FR_que_20200305 Question: 11 a QP Page: 63 MS Page: 84
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4MA1_2F_que_20201106 Question: 2 b QP Page: 94 MS Page: 121
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A.1.11 Electronic calculators

4MA1_2FR_que_20200305 Question: 1 d QP Page: 54 MS Page: 81
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4MA1_2FR_que_20201106 Question: 19 QP Page: 153 MS Page: 173

A.2 Equations, formulae and identities

A.2.1 Use of symbols

4MA1_2F_que_20200305 Question: 17 a QP Page: 19 MS Page: 40
4MA1_2F_que_20200305 Question: 17 b QP Page: 19 MS Page: 40
4MA1_2FR_que_20200305 Question: 12 a QP Page: 64 MS Page: 84
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4MA1_2F_que_20201106 Question: 21 a QP Page: 112 MS Page: 131
4MA1_2F_que_20201106 Question: 21 b QP Page: 112 MS Page: 131
4MA1_2FR_que_20201106 Question: 23 a QP Page: 156 MS Page: 175
4MA1_2FR_que_20201106 Question: 23 b QP Page: 156 MS Page: 175

A.2.2 Algebraic manipulation

4MA1_2F_que_20200305 Question: 5 a QP Page: 9 MS Page: 34
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4MA1_2F_que_20200305 Question: 13 b QP Page: 16 MS Page: 38
4MA1_2FR_que_20200305 Question: 18 a QP Page: 69 MS Page: 86
4MA1_2FR_que_20200305 Question: 18 b QP Page: 69 MS Page: 86
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4MA1_2F_que_20201106 Question: 14 b QP Page: 105 MS Page: 127
4MA1_2FR_que_20201106 Question: 12 a QP Page: 147 MS Page: 170
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A.2.3 Expressions and formulae

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4MA1_2F_que_20200305 Question: 13 d QP Page: 16 MS Page: 38
4MA1_2FR_que_20201106 Question: 8 a QP Page: 144 MS Page: 168
4MA1_2FR_que_20201106 Question: 8 b QP Page: 144 MS Page: 168
4MA1_2FR_que_20201106 Question: 8 c QP Page: 144 MS Page: 168

A.2.4 Linear equations

4MA1_2F_que_20200305 Question: 5 b QP Page: 9 MS Page: 34
4MA1_2F_que_20200305 Question: 20 QP Page: 21 MS Page: 42
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4MA1_2FR_que_20200305 Question: 23 QP Page: 72 MS Page: 87
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A.2.5 Simultaneous linear equations

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A.2.6 Quadratic equations

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A.2.7 Inequalities

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4MA1_2FR_que_20200305 Question: 25 a QP Page: 74 MS Page: 87
4MA1_2FR_que_20200305 Question: 25 b QP Page: 74 MS Page: 87
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A.3 Sequences, functions and graphs

A.3.1 Sequences

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A.3.2 Graphs

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4MA1_2FR_que_20200305 Question: 7 a QP Page: 59 MS Page: 82
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4MA1_2FR_que_20200305 Question: 7 c QP Page: 59 MS Page: 82
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4MA1_2F_que_20201106 Question: 7 b QP Page: 99 MS Page: 123
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4MA1_2F_que_20201106 Question: 7 d QP Page: 99 MS Page: 123
4MA1_2F_que_20201106 Question: 9 a QP Page: 101 MS Page: 124
4MA1_2F_que_20201106 Question: 9 b QP Page: 101 MS Page: 124
4MA1_2FR_que_20201106 Question: 25 QP Page: 157 MS Page: 176

A.4 Geometry and trigonometry

A.4.1 Angles, lines and triangles

4MA1_2FR_que_20200305 Question: 15 QP Page: 67 MS Page: 85
4MA1_2FR_que_20201106 Question: 5 d QP Page: 141 MS Page: 166
4MA1_2FR_que_20201106 Question: 7 QP Page: 143 MS Page: 167

A.4.2 Polygons

4MA1_2F_que_20200305 Question: 6 c QP Page: 9 MS Page: 34
4MA1_2F_que_20200305 Question: 15 QP Page: 18 MS Page: 39
4MA1_2FR_que_20200305 Question: 26 QP Page: 75 MS Page: 88
4MA1_2F_que_20201106 Question: 18 QP Page: 109 MS Page: 129
4MA1_2FR_que_20201106 Question: 5 b QP Page: 141 MS Page: 166
4MA1_2FR_que_20201106 Question: 26 QP Page: 158 MS Page: 176

A.4.3 Symmetry

4MA1_2FR_que_20201106 Question: 5 c QP Page: 141 MS Page: 166

A.4.4 Measures

4MA1_2F_que_20200305 Question: 26 QP Page: 26 MS Page: 46
4MA1_2FR_que_20200305 Question: 6 QP Page: 58 MS Page: 82
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A.4.5 Construction

4MA1_2F_que_20200305 Question: 6 b QP Page: 9 MS Page: 34
4MA1_2F_que_20200305 Question: 21 QP Page: 22 MS Page: 42
4MA1_2FR_que_20200305 Question: 3 a QP Page: 56 MS Page: 81
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4MA1_2FR_que_20200305 Question: 5 QP Page: 58 MS Page: 82
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A.4.6 Trigonometry and Pythagoras' theorem

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A.4.7 Mensuration

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4MA1_2F_que_20200305 Question: 27 QP Page: 27 MS Page: 47
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4MA1_2F_que_20201106 Question: 23 QP Page: 114 MS Page: 132
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A.4.8 3D shapes and volume

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4MA1_2F_que_20200305 Question: 25 QP Page: 26 MS Page: 46
4MA1_2F_que_20201106 Question: 2 a QP Page: 94 MS Page: 121
4MA1_2F_que_20201106 Question: 24 QP Page: 115 MS Page: 133
4MA1_2FR_que_20201106 Question: 2 a QP Page: 139 MS Page: 165
4MA1_2FR_que_20201106 Question: 2 b QP Page: 139 MS Page: 165
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A.5 Vectors and transformation geometry

A.5.1 Transformation geometry

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A.6 Statistics and probability

A.6.1 Graphical representation of data

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4MA1_2FR_que_20200305 Question: 8 a QP Page: 60 MS Page: 83
4MA1_2F_que_20201106 Question: 3 a QP Page: 95 MS Page: 121
4MA1_2F_que_20201106 Question: 10 QP Page: 102 MS Page: 124
4MA1_2FR_que_20201106 Question: 4 a QP Page: 140 MS Page: 166
4MA1_2FR_que_20201106 Question: 4 b QP Page: 140 MS Page: 166
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A.6.2 Statistical measures

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4MA1_2F_que_20200305 Question: 9 c QP Page: 12 MS Page: 36
4MA1_2FR_que_20200305 Question: 2 a QP Page: 55 MS Page: 81
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4MA1_2F_que_20201106 Question: 3 c QP Page: 95 MS Page: 121
4MA1_2F_que_20201106 Question: 16 a QP Page: 106 MS Page: 128
4MA1_2F_que_20201106 Question: 16 b QP Page: 106 MS Page: 128
4MA1_2FR_que_20201106 Question: 17 QP Page: 152 MS Page: 172
4MA1_2FR_que_20201106 Question: 21 QP Page: 155 MS Page: 174

A.6.3 Probability

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