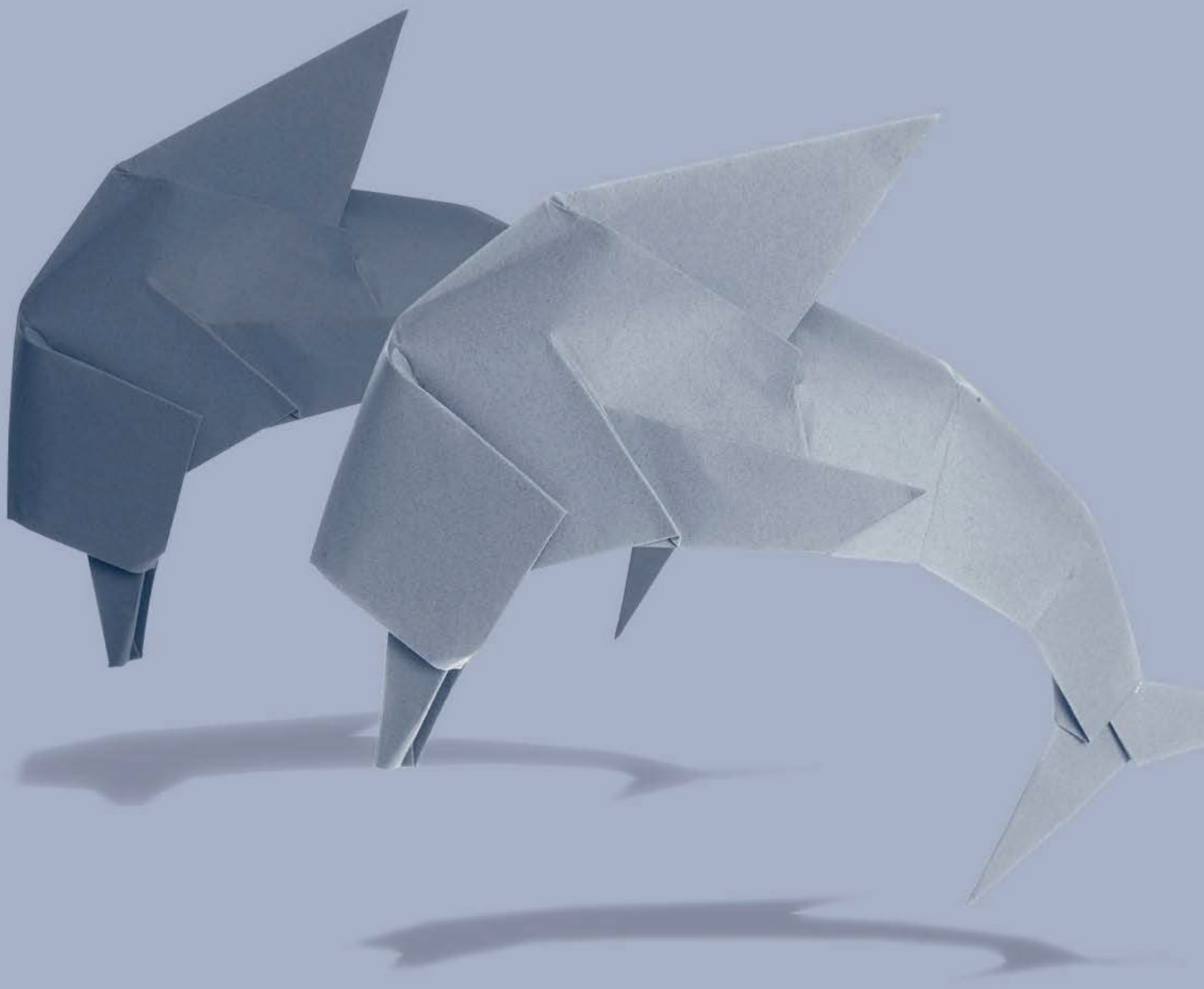
edexcel

GCSE (9-1) Mathematics



SPECIMEN PAPERS SET 1

Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Mathematics (1MA1)

ALWAYS LEARNING

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All information in this document is correct at time of publication.

Introduction

These specimen papers have been produced to complement the sample assessment materials for Pearson Edexcel Level 1/ Level 2 GCSE (9-1) in Mathematics and are designed to provide extra practice for your students. The specimen papers are part of a suite of support materials offered by Pearson.

The specimen papers do not form part of the accredited materials for this qualification.

General marking guidance

These notes offer general guidance, but the specific notes for examiners appertaining to individual questions take precedence.

1 All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.

Where some judgement is required, mark schemes will provide the principles by which marks will be awarded; exemplification/indicative content will not be exhaustive.

2 All the marks on the mark scheme are designed to be awarded; mark schemes should be applied positively. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme. If there is a wrong answer (or no 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.

Questions where working is not required: In general, the correct answer should be given full marks.
Questions that specifically require working: In general, candidates who do not show working on this type of question will get no marks – full details will be given in the mark scheme for each individual question.

3 Crossed out work
This should be marked **unless** the candidate has replaced it with an alternative response.

4 Choice of method
If there is a choice of methods shown, mark the method that leads to the answer given on the answer line.

If no answer appears on the answer line, mark both methods **then award the lower number of marks.**

5 Incorrect method
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review for your Team Leader to check.

6 Follow through marks
Follow through marks which involve a single stage calculation can be awarded without working as you can check the answer, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

7 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 or its context. (eg. an incorrectly cancelled fraction when the unsimplified fraction would gain full marks).

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect (eg. incorrect algebraic simplification).

8 Probability

Probability answers must be given as a fraction, percentage or decimal. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

9 Linear equations

Unless indicated otherwise in the mark scheme, full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously identified in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

10 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and all numbers within the range.

Guidance on the use of abbreviations within this mark scheme	
M	method mark awarded for a correct method or partial method
P	process mark awarded for a correct process as part of a problem solving question
A	accuracy mark (awarded after a correct method or process; if no method or process is seen then full marks for the question are implied but see individual mark schemes for more details)
C	communication mark
B	unconditional accuracy mark (no method needed)
oe	or equivalent
cao	correct answer only
ft	follow through (when appropriate as per mark scheme)
sc	special case
dep	dependent (on a previous mark)
indep	independent
awrt	answer which rounds to
isw	ignore subsequent working

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 1 (Non-Calculator)

Foundation Tier

Specimen Papers Set 1	Paper Reference
Time: 1 hour 30 minutes	**1MA1/1F**

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may not be used.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Change 530 centimetres into metres.

..... metres

(Total for Question 1 is 1 mark)

2 How many minutes are there in $3\frac{1}{4}$ hours?

..... minutes

(Total for Question 2 is 1 mark)

3 Write 4.4354 correct to 2 decimal places.

.....

(Total for Question 3 is 1 mark)

4 Write 0.9 as a percentage.

.....%

(Total for Question 4 is 1 mark)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

5 Work out $(-3)^3$

.....

(Total for Question 5 is 1 mark)

6 Here are four cards.
There is a number on each card.

4	5	2	1

(a) Write down the largest 4-digit even number that can be made using each card only once.

.....

(2)

(b) Write down all the 2-digit numbers that can be made using these cards.

(2)

(Total for Question 6 is 4 marks)

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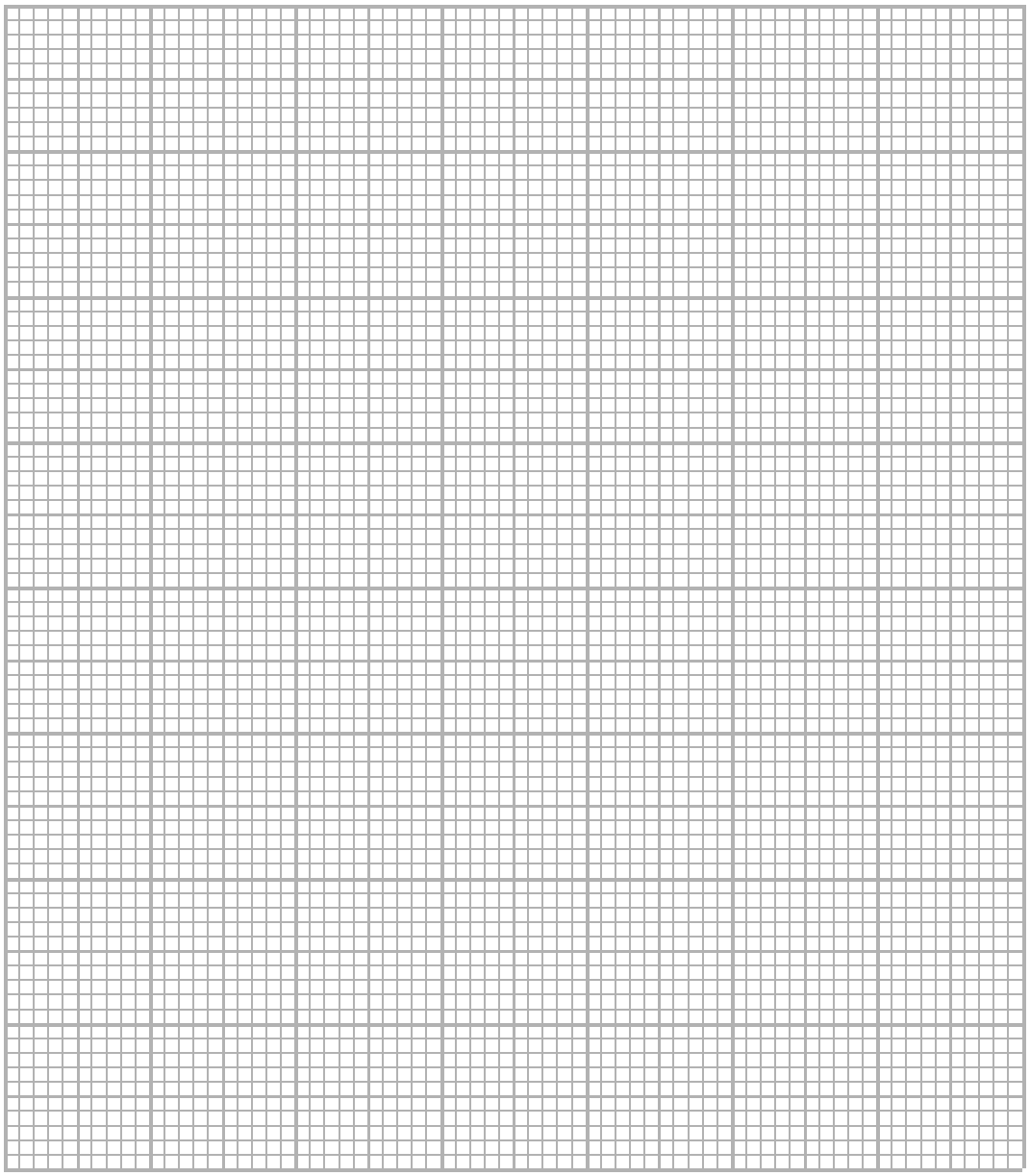
7 The table shows information about the sports some students like best.

	Hockey	**Tennis**	**Football**	**Golf**
Boys	3	8	15	9
Girls	6	14	7	1

Draw a suitable diagram or chart for this information.



(Total for Question 7 is 4 marks)

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8 Bernard says,

"When you halve a whole number that ends in 8, you always get a number that ends in 4"

(a) Write down an example to show that Bernard is wrong.

.....

(1)

Alice says,

"Because 7 and 17 are both prime numbers, all whole numbers that end in 7 are prime numbers."

(b) Is Alice correct?
You must give a reason with your answer.

.....

.....

(1)

(Total for Question 8 is 2 marks)

9 Work out 247×63

.....

(Total for Question 9 is 3 marks)

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10 An American airline has a maximum size for bags on its planes.
The diagram shows the maximum dimensions.

Chris has a bag.

It has
height 50 cm
width 40 cm
depth 20 cm

1 inch = 2.54 cm

Can Chris take this bag on the plane?
You must show your working.

(Total for Question 10 is 3 marks)

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11 Complete the two-way table.

	blue eyes	brown eyes	green eyes	total
boys	5		4	12
girls		7		
total			9	30

(Total for Question 11 is 3 marks)

12 There are 28 red pens and 84 black pens in a bag.

Write down the ratio of the number of red pens to the number of black pens.
Give your ratio in its simplest form.

.....

(Total for Question 12 is 2 marks)

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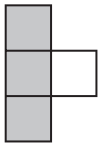
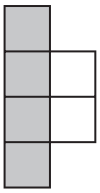
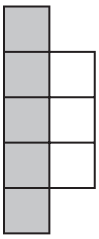
13 Here is a sequence of patterns made with grey square tiles and white square tiles.



pattern number 1



pattern number 2



pattern number 3

(a) In the space below, draw pattern number 4

(1)

(b) Find the total number of tiles in pattern number 20

.....

(2)

(c) Write an expression, in terms of n, for the number of grey tiles in pattern number n.

.....

(2)

(Total for Question 13 is 5 marks)

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14 A unit of gas costs 4.2 pence.

On average Ria uses 50.1 units of gas a week.
She pays for the gas she uses in 13 weeks.

(a) Work out an estimate for the amount Ria pays.

.....

(3)

(b) Is your estimate to part (a) an underestimate or an overestimate?
Give a reason for your answer.

.....

.....

(1)

(Total for Question 14 is 4 marks)

15 This is a scale plan of a rectangular floor.

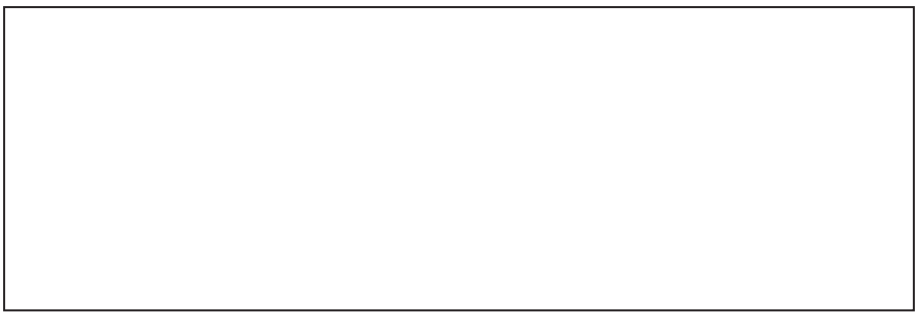

Diagram **accurately** drawn

Scale: 1 cm represents 2 m

Mrs Bridges is going to cover the floor with boards.
Each board is rectangular in shape.

Each board is 1.2 m long and 1 m wide.

Mrs Bridges has 150 boards.
Does she have enough boards?
You must show how you get your answer.

(Total for Question 15 is 3 marks)

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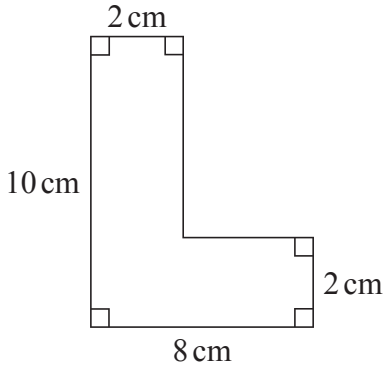
16

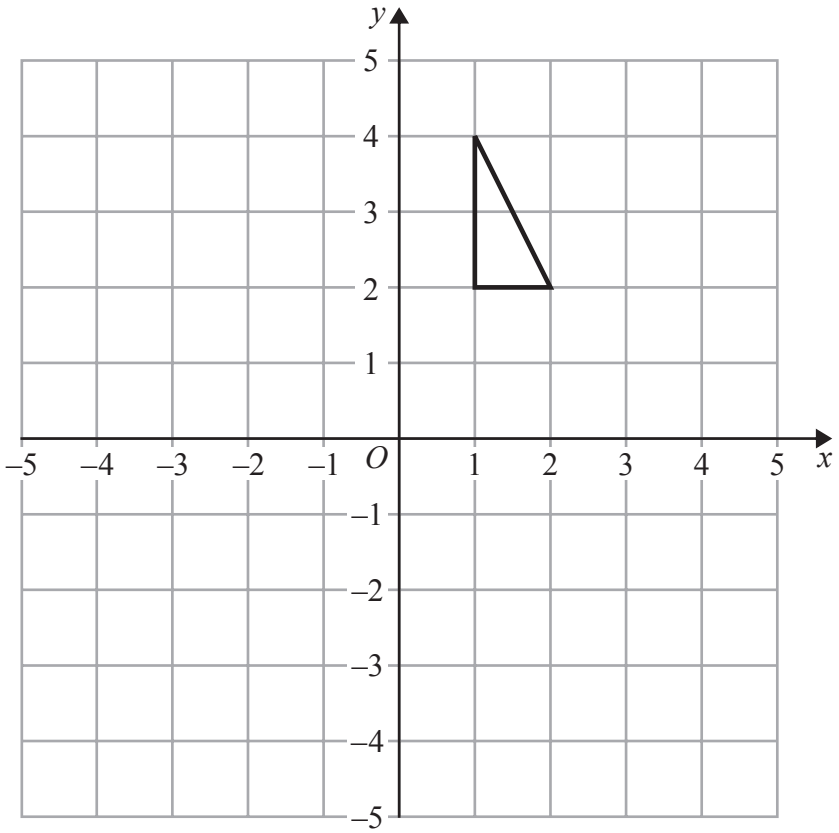


Work out the area of the shape.

..... cm^2

(Total for Question 16 is 2 marks)

17



On the grid, rotate the triangle 90° clockwise about (0, 0).

(Total for Question 17 is 2 marks)

18 There are 500 passengers on a train.

$\frac{7}{20}$ of the passengers are men.

40% of the passengers are women.

The rest of the passengers are children.

Work out the number of children on the train.

.....

(Total for Question 18 is 3 marks)

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19 A shop sells milk in 1 pint bottles and in 2 pint bottles.

Each 1 pint bottle of milk costs 52p.
Each 2 pint bottle of milk costs 93p.

Martin has **no** milk.

He assumes that he uses, on average, $\frac{3}{4}$ of a pint of milk each day.

Martin wants to buy enough milk to last for 7 days.

(a) Work out the smallest amount of money Martin needs to spend on milk.
You must show all your working.

£.....

(3)

Martin actually uses more than $\frac{3}{4}$ of a pint of milk each day.

(b) Explain how this might affect the amount of money he needs to spend on milk.

.....

.....

.....

.....

(1)

(Total for Question 19 is 4 marks)

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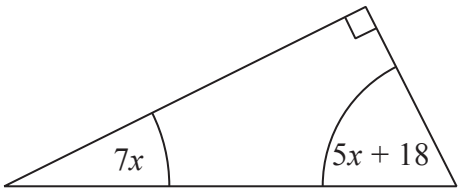
20 The diagram shows a right-angled triangle.



All the angles are in degrees.

Work out the size of the smallest angle of the triangle.

.....°

(Total for Question 20 is 3 marks)

21 A box exerts a force of 140 newtons on a table.
The pressure on the table is 35 newtons/m^2.

Calculate the area of the box that is in contact with the table.

$$p = \frac{F}{A}$$

p = pressure
F = force
A = area

.....

(Total for Question 21 is 3 marks)

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22 There are only red counters, blue counters, green counters and yellow counters in a bag.

The table shows the probabilities of picking at random a red counter and picking at random a yellow counter.

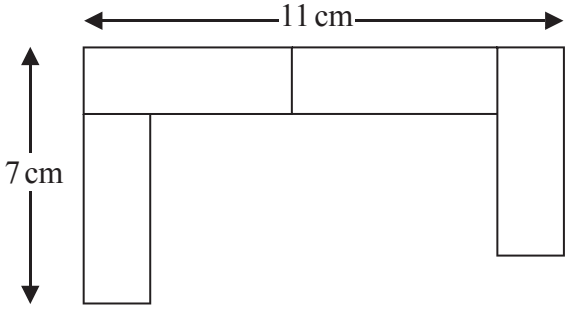
Colour	red	blue	green	yellow
Probability	0.24			0.32

The probability of picking a blue counter is the same as the probability of picking a green counter.

Complete the table.

(Total for Question 22 is 2 marks)

23 A pattern is made using identical rectangular tiles.



Find the total area of the pattern.

..... cm^2

(Total for Question 23 is 4 marks)

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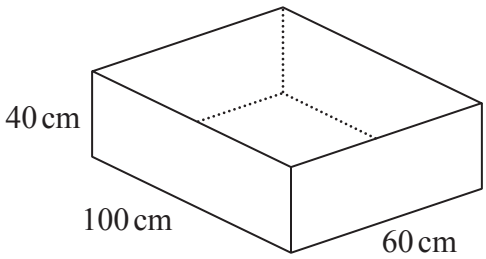
24 The diagram shows a sand pit.
The sand pit is in the shape of a cuboid.



Sally wants to fill the sand pit with sand.
A bag of sand costs £2.50
There are 8 litres of sand in each bag.

Sally says,

"The sand will cost less than £70"

Show that Sally is wrong.

(Total for Question 24 is 5 marks)

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25 Four friends each throw a biased coin a number of times.
The table shows the number of heads and the number of tails each friend got.

	Ben	**Helen**	**Paul**	**Sharif**
heads	34	66	80	120
tails	8	12	40	40

The coin is to be thrown one more time.

(a) Which of the four friends' results will give the best estimate for the probability that the coin will land heads?
Justify your answer.

.....

.....

.....

(1)

Paul says,

"With this coin you are twice as likely to get heads as to get tails."

(b) Is Paul correct?
Justify your answer.

.....

.....

.....

(2)

The coin is to be thrown twice.

(c) Use all the results in the table to work out an estimate for the probability that the coin will land heads both times.

.....

(2)

(Total for Question 25 is 5 marks)

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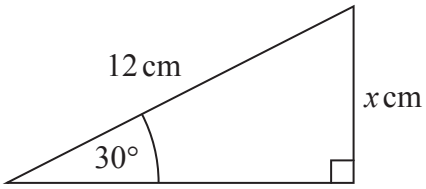
26 (a) Write down the exact value of $\cos 30°$

.....

(1)

(b)



Given that $\sin 30° = 0.5$,
work out the value of x.

.....

(2)

(Total for Question 26 is 3 marks)

27 Expand and simplify $(x + 3)(x - 1)$

.....

(Total for Question 27 is 2 marks)

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28 Factorise $x^2 - 16$

.....

(Total for Question 28 is 1 mark)

29 Solve the simultaneous equations

$$4x + y = 25$$
$$x - 3y = 16$$

$x =$ ..... , $y =$ .....

(Total for Question 29 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 1F			
Question	**Working**	**Answer**	**Notes**
1		5.3(0)	B1 cao
2		195	B1 cao
3		4.44	B1 cao
4		90	B1 cao
5		−27	B1 cao
6 (a)		5412	B2 (B1 for any 4-digit even number using 4,5,1,2 **or** 5421)
(b)		45, 54, 41, 14, 42, 24, 51, 15, 52, 25, 12, 21	P1 Starts to list systematically; at least 6 correct seen (ignore repeats) A1 Lists all 12 numbers (condone inclusion of **all** repeats 44, 55 etc)
7		chart	C1 for key or suitable labels to identify boys and girls C1 for 4 correct sport labels or a linear scale C1 for diagram or chart (combined or separate), correctly showing data for at least 3 sports C1 for fully correct diagram or chart with axes correctly scaled and labelled
8 (a)		example	C1 for appropriate example shown
(b)		example	C1 conclusion

Paper 1MA1: 1F			
Question	**Working**	**Answer**	**Notes**
9		15561	M1 for complete method with relative place value correct (addition not necessary) M1 for addition of all appropriate elements A1 cao
10		No (supported)	P1 starts the process by converting one dimension A1 converts at least one measurement C1 conclusion eg No, since the 40 cm > 14 inches
11	(5) **3** (4) (12) **6** (7) **5** **18** **11** **10** (9) (30)	table	C1 for at least 2 correct numbers C1 for at least 4 correct numbers C1 for completed table
12		1 : 3	M1 for stating a ratio eg 28 : 84 or 1 : 3 incorrectly stated or 3:1 A1 cao
13 (a)		drawing	C1 drawing of pattern number 4
(b)		42	C1 shows a process of working towards pattern number 20 C1 cao
(c)		$n + 2$	C1 begins process of stating algebraic expression eg n C1 $n + 2$ oe

Paper 1MA1: 1F			
Question	**Working**	**Answer**	**Notes**
14 (a)		2000p-2600p	P1 Evidence of estimate eg. 4 or 50 used in calculation P1 complete process to solve problem A1 2000p-2600p or £20-£26
(b)		under	C1 underestimate as values have been rounded down
15		no with evidence	P1 interprets the information and the scale eg in calculations or shown as part of a diagram eg 8m x 24m (=192) or 8 x 20 (=160) P1 a correct process to fit boards into the space in a logical way or 150×1×1.2 (=180) C1 "no" with supportive evidence eg showing 160 needed or 180<192
16		32	M1 for method to find area of any one rectangle A1 cao
17		rotation	M1 for triangle in correct orientation or rotation 90° anticlockwise A1 cao
18		125	P1 for process to find 7/20 of 500 (=175) or 7/20 + 4/10 (=3/4) P1 for process to find 40% of 500 (=200) or ¼ × 500 A1 cao

Paper 1MA1: 1F			
Question	**Working**	**Answer**	**Notes**
19 (a)		2.79	P1 begins to work with figures eg finding 7× ¾ (=5.25) P1 works with integers eg 5.25 as 6 pints and 3 × 2 pints A1 cao
(b)		pay more	C1 deduces he may have to pay more [if he uses more than 0.857 pints a day]
20		42	P1 process to start problem solving eg forms an appropriate equation P1 complete process to solve equation A1 cao
21		4 m^2	C1 substitution into formula eg $35 = \frac{140}{A}$ A1 4 (oe) stated C1 (indep) units stated eg m^2
22		0.22	P1 begins process of subtraction of probabilities from 1 A1 oe
23		48	P1 begins to work with rectangle dimensions eg $l+w=7$ or $2\times l+w$ (=11) C1 shows a result for a dimension eg using $l=4$ or $w=3$ P1 begins process of finding total area eg 4 × "3" × "4" A1 cao

Paper 1MA1: 1F				
Question	**Working**	**Answer**	**Notes**	
24		explanation	M1 works with volume eg 240000 M1 uses conversion 1 litre = 1000 cm^3 M1 uses 8000 eg vol ÷ 8000 (=30) M1 uses "30" eg "30" × 2.50 C1 for explanation and 75 stated	begins working back eg 70÷2.50 uses conversion 1 litre = 1000 cm^3 uses 8000 eg "28"× 8000 (=224000) works with vol. eg 224000 for explanation with 240000 and 224000
25 (a) (b) (c)	Tot: H 300 T 100	Sharif Decision (supported) $\frac{9}{16}$	B1 Sharif with mention of greatest total throws P1 starts working with proportions A1 Conclusion: correct for Paul, but not for the rest; or ref to just Paul's results P1 selects Sharif or overall and multiplies P(heads)×P(heads) eg ¾ × ¾ A1 oe	
26 (a) (b)		$\frac{\sqrt{3}}{2}$ 6	B1 M1 starts process eg $\sin 30 = \frac{x}{12}$ A1 answer given	
27		x^2+2x-3	M1 starts expansion: at least 3 terms correct with signs, or four terms correct ignoring signs A1 for x^2+2x-3	

Paper 1MA1: 1F			
Question	**Working**	**Answer**	**Notes**
28		$(x+4)(x-4)$	B1 for $(x+4)(x-4)$
29		$x=7$, $y=-3$	M1 for correct process to eliminate one variable (condone one arithmetic error) M1 (dep) for substituting found value in one of the equations or appropriate method after starting again (condone one arithmetic error) A1 for both correct solutions

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 2 (Calculator)

Foundation Tier

Specimen Papers Set 1	Paper Reference
Time: 1 hour 30 minutes	**1MA1/2F**

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write down the value of the 3 in 16.35

.....

(Total for Question 1 is 1 mark)

2 Here is a list of six numbers.

1 3 6 9 12 24

Which number in the list is **not** a factor of 24?

.....

(Total for Question 2 is 1 mark)

3 Write 0.21 as a fraction.

.....

(Total for Question 3 is 1 mark)

4 (a) Simplify $5f - f + 2f$

.....

(1)

(b) Simplify $2 \times m \times n \times 8$

.....

(1)

(c) Simplify $t^2 + t^2$

.....

(1)

(Total for Question 4 is 3 marks)

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DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

5 A shop sells pens at different prices.
The cheapest pens in the shop cost 27p each.

Lottie buys 18 pens from the shop.
She pays with a £10 note.

(a) If Lottie buys 18 of the cheapest pens, how much change should Lottie get?

£.....

(2)

Instead of buying the cheapest pens, Lottie buys 18 of the more expensive pens.
She still pays with a £10 note.

(b) How does this affect the amount of change she should get?

.....

.....

(1)

(Total for Question 5 is 3 marks)

6 Michelle and Wayne have saved a total of £458 for their holiday.
Wayne saved £72 more than Michelle.

How much did Wayne save?

£.....

(Total for Question 6 is 2 marks)

7 Work out 70% of £90

£.....

(Total for Question 7 is 2 marks)

8 Here are four fractions.

$$\frac{1}{2} \qquad \frac{17}{24} \qquad \frac{3}{4} \qquad \frac{5}{12}$$

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

.....

(Total for Question 8 is 2 marks)

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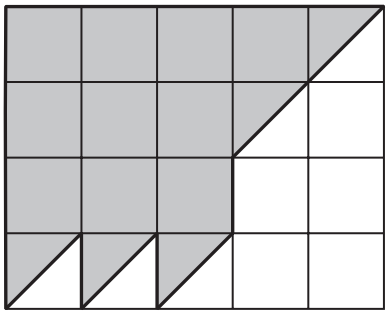
9 What percentage of this shape is shaded?



..... %

(Total for Question 9 is 3 marks)

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10 The manager of a clothes shop recorded the size of each dress sold one morning.

10	10				
12	12				
14	14	14	14	14	14
16	16	16	16		
18	18	18			
20	20	20			

The sizes of dresses are always even numbers.
The mean size of the dresses sold that morning is 15.3

The manager says,

"The mean size of the dresses is **not** a very useful average."

(i) Explain why the manager is right.

.....

.....

(ii) Which is the more useful average for the manager to know, the median or the mode?
You must give a reason for your answer.

.....

.....

.....

(Total for Question 10 is 2 marks)

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11 In a shop, the normal price of a coat is £65
The shop has a sale.

In week 1 of the sale, the price of the coat is reduced by 20%
In week 2 of the sale, the price of the coat is reduced by a further £10

Maria has £40

Does Maria have enough money to buy the coat in week 2 of the sale?
You must show how you get your answer.

(Total for Question 11 is 3 marks)

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12 The length of a car is 3.6 metres.

Karl makes a scale model of the car.
He uses a scale of 1 cm to 30 cm.

Work out the length of the scale model of the car.
Give your answer in centimetres.

..... cm

(Total for Question 12 is 2 marks)

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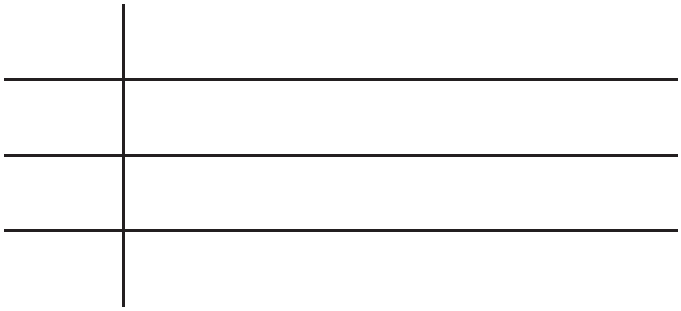
13 Here are the heights, in centimetres, of 15 children.

123	147	135	150	147
129	148	149	125	137
133	138	133	130	151

(a) Show this information in a stem and leaf diagram.



(3)

One of the children is chosen at random.

(b) What is the probability that this child has a height greater than 140 cm?

(2)

(Total for Question 13 is 5 marks)

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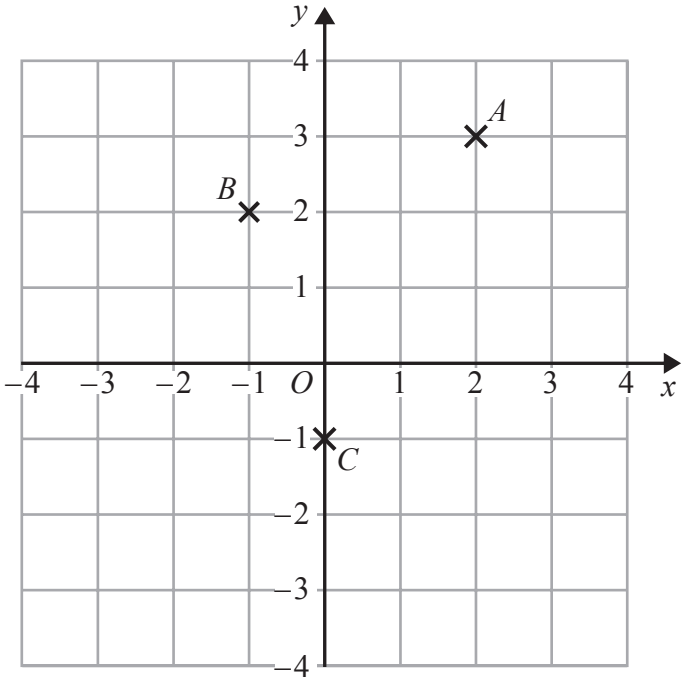
14



(a) Write down the coordinates of point C.

(..... , ...)

(1)

$ABCD$ is a square.

(b) On the grid, mark with a cross (×) the point D so that $ABCD$ is a square.

(1)

(c) Write down the coordinates of the midpoint of the line segment BC.

(..... , ...)

(1)

(Total for Question 14 is 3 marks)

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15 (a) Work out $\frac{4}{5}$ of 210 cm.

..... cm

(1)

(b) Work out $(6 - 2.5)^2 + \sqrt{9.34 - 2.58}$

.....

(2)

(Total for Question 15 is 3 marks)

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16 (a) Solve $4c + 5 = 11$

$c =$ .....

(2)

(b) Solve $5(e + 7) = 20$

$e =$ .....

(2)

(c) Simplify $(m^3)^2$

.....

(1)

(Total for Question 16 is 5 marks)

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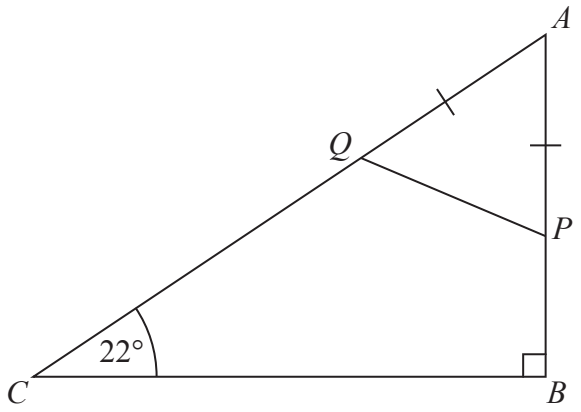
17 *ABC* is a right-angled triangle.



P is a point on *AB*.
Q is a point on *AC*.
AP = *AQ*.

Work out the size of angle *AQP*.
You must give a reason for each stage of your working.

(Total for Question 17 is 4 marks)

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18 Here is a list of ingredients for making 16 mince pies.

Ingredients for 16 mince pies
240 g of butter 350 g of flour 100 g of sugar 280 g of mincemeat

Elaine wants to make 72 mince pies.

How much of each ingredient will Elaine need?

butter ..... g

flour ..... g

sugar ..... g

mincemeat ..... g

(Total for Question 18 is 3 marks)

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19 Lethna worked out $\frac{2}{5} + \frac{1}{2}$

She wrote:

$$\frac{2}{5} + \frac{1}{2} = \frac{2}{10} + \frac{1}{10} = \frac{3}{10}$$

The answer of $\frac{3}{10}$ is wrong.

(a) Describe one mistake that Lethna made.

.....

.....

(1)

Dave worked out $1\frac{1}{2} \times 5\frac{1}{3}$

He wrote:

$$1 \times 5 = 5 \quad \text{and} \quad \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$$

$$\text{so} \quad 1\frac{1}{2} \times 5\frac{1}{3} = 5\frac{1}{6}$$

The answer of $5\frac{1}{6}$ is wrong.

(b) Describe one mistake that Dave made.

.....

.....

(1)

(Total for Question 19 is 2 marks)

20 Make t the subject of the formula $w = 3t + 11$

(Total for Question 20 is 2 marks)

21 Three companies sell the same type of furniture.

The price of the furniture from Pooles of London is £1480
The price of the furniture from Jardins of Paris is €1980
The price of the furniture from Outways of New York is $2250

The exchange rates are

£1 = €1.34

£1 = $1.52

Which company sells this furniture at the lowest price?
You must show how you get your answer.

(Total for Question 21 is 3 marks)

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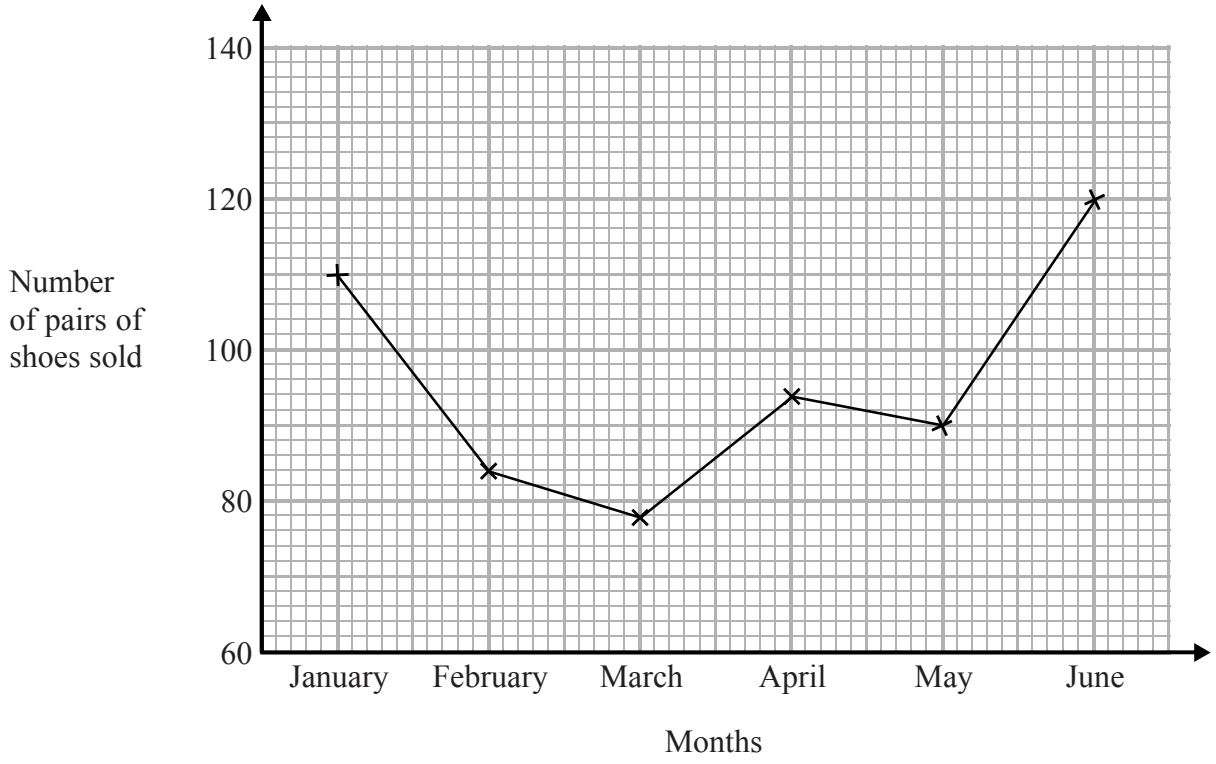
22 The time-series graph gives some information about the number of pairs of shoes sold in a shoe shop in the first six months of 2014



The sales target for the first six months of 2014 was to sell a mean of 96 pairs of shoes per month.

Did the shoe shop meet this sales target?
You must show how you get your answer.

(Total for Question 22 is 3 marks)

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23 The grouped frequency table gives information about the heights of 30 students.

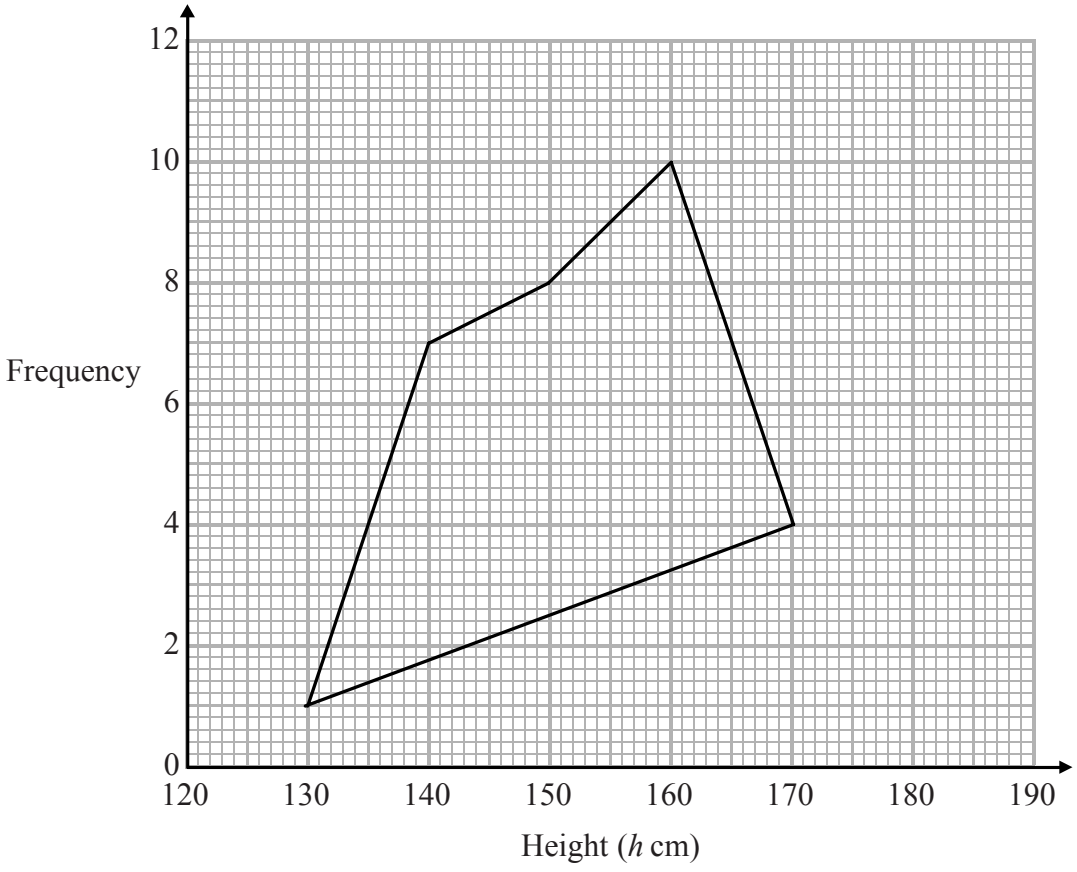
Height (h cm)	Frequency
$130 < h \leqslant 140$	1
$140 < h \leqslant 150$	7
$150 < h \leqslant 160$	8
$160 < h \leqslant 170$	10
$170 < h \leqslant 180$	4

(a) Write down the modal class interval.

.....

(1)

This incorrect frequency polygon has been drawn for the information in the table.



(b) Write down two things wrong with this incorrect frequency polygon.

1 .....

2 .....

(2)

(Total for Question 23 is 3 marks)

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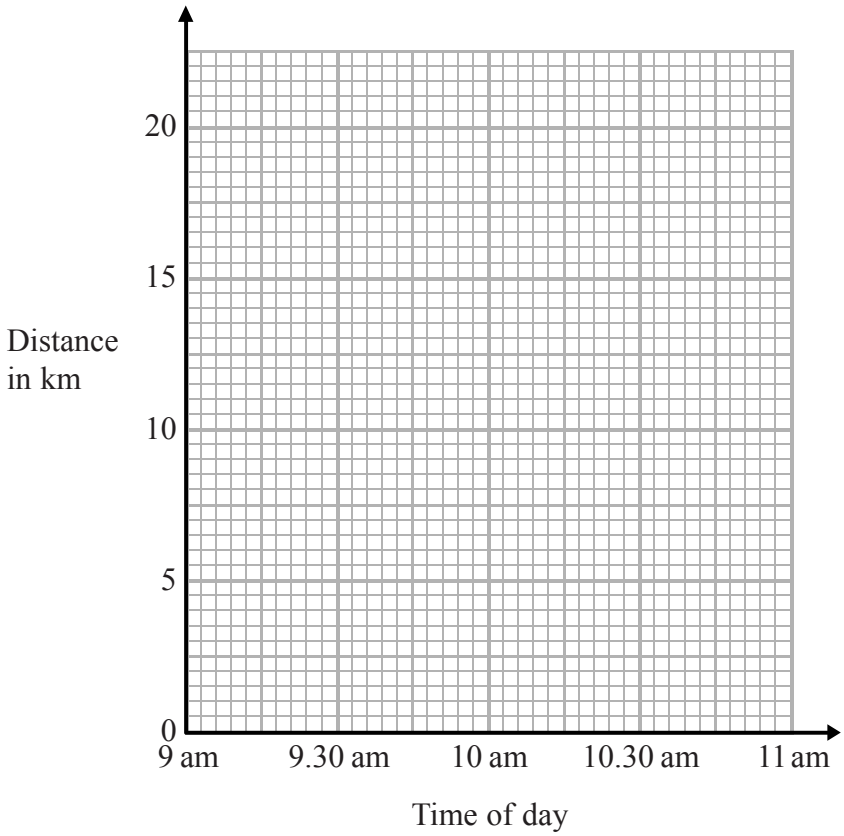
24 At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h.
From 9.36 am to 10.45 am, he cycled a further 8 km.

(a) Draw a travel graph to show Bradley's journey.



(3)

From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

(b) Work out the distance Bradley cycled from 10.45 am to 11 am.

..... km

(2)

(Total for Question 24 is 5 marks)

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25 Toby invested £7500 for 2 years in a savings account.
He was paid 4% per annum compound interest.

How much money did Toby have in his savings account at the end of 2 years?

£ .....

(Total for Question 25 is 2 marks)

26 Becky has some marbles.
Chris has two times as many marbles as Becky.
Dan has seven more marbles than Chris.

They have a total of 57 marbles.

Dan says,
"If I give some marbles to Becky, each of us will have the same number of marbles."

Is Dan correct?
You must show how you get your answer.

(Total for Question 26 is 3 marks)

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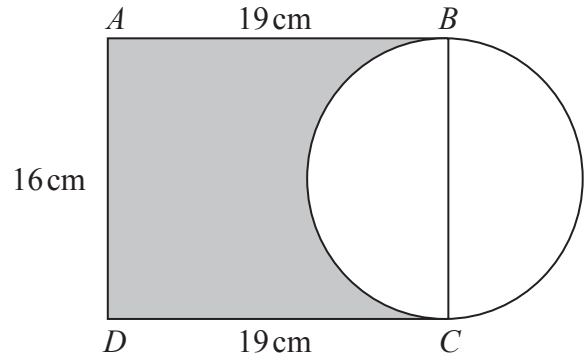
27 Here is a diagram showing a rectangle, *ABCD*, and a circle.



BC is a diameter of the circle.

Calculate the percentage of the area of the rectangle that is shaded.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 27 is 4 marks)

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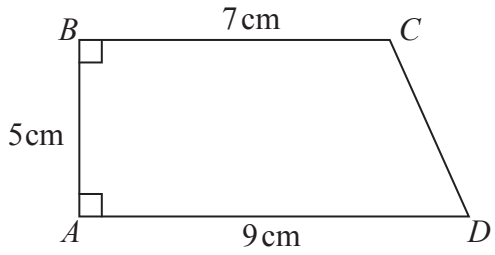
28 *ABCD* is a trapezium.



A square has the same perimeter as this trapezium.

Work out the area of the square.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 28 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 2F				
Question		**Working**	**Answer**	**Notes**
1			3 tenths or $\frac{3}{10}$	B1
2			9	B1
3			$\frac{21}{100}$	B1
4	a		$6f$	B1
	b		$16mn$	B1
	c		$2t^2$	B1 cao
5	a	27 × 18 = 486	5.14	M1 for 1000 – "27 × 18" A1 cao
	b		"less change"	C1 for "less change" oe
6		458 – 72 = 386 386 ÷ 2 = 193	265	P1 for start to the process, eg. 458 – 72 or 458 ÷ 2 (= 229) and 72 ÷ 2 (= 36) A1
7			63	M1 for a method to find percentage of a quantity A1

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
8		$\frac{5}{12}, \frac{1}{2}, \frac{17}{24}, \frac{3}{4}$	M1 for a method to convert each to a form that can be easily used for comparing, eg. $\frac{5}{12} = \frac{10}{24}$ A1 for correct order
9		62.5	M1 for 12.5 squares or use of 1 sq = 5% M1 for 12.5÷20×100 oe A1 or 62½
10 i ii			C1 for correct criticism of use of mean, eg. "there is no dress size of 15.3" C1 Mode (=14) is most useful since it shows the most popular size
11		for 'no' with supporting evidence	P1 for correct process to find price in Week 1, eg. 65 × 0.8 (= 52) P1 for process to find the price in week 2, eg. "52" – 10 (= 42) C1 for 'no' with supporting evidence
12		12	P1 for complete process including unit conversion, eg. 3.6 × 100 ÷ 30 A1 cao

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
13 a		12| 3 5 9 13| 0 3 3 5 7 8 14| 7 7 8 9 15| 0 1 Key: 12|3 represents 123	C1 for an unordered diagram with just one error or for an ordered diagram with no more than two errors C1 for a fully correct diagram C1 for a correct key (units may be omitted but must be correct if included)
b		$\frac{6}{15}$ oe	M1 for correct interpretation from their diagram (or from original information) of the number (6) out of 15 over 140 A1 for $\frac{6}{15}$ oe or ft their diagram
14 a		(0, –1)	B1
b		× marked at (3, 0)	B1
c		(–0.5, 0.5)	B1
15 a		168	B1
b		14.85	M1 for 12.25 or 2.6 A1

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
16 a		1.5 oe	M1 for rearranging, eg 11 – 5 = 4*c* A1
b		–3	M1 for a first step of either dividing both sides by 5, eg. $\frac{5(e+7)}{5} = \frac{20}{5}$ or for expanding the bracket, eg. $5\times e + 5\times 7 = 20$ A1 cao
c		m^6	B1
17		56° with reasons	M1 for a method leading to the evaluation of another angle, eg. angle *A* =180 – 90 – 22 (=68) M1 for correctly using the isosceles property in identifying two equal angles, eg (180 – "68")÷2 (= 56) C1 for at least one correct reason given linked to clear working. C1 For all correct reasons included Reasons as appropriate from: sum of angles in a triangle = 180° base angles of isosceles triangle are equal sum of angles on a straight line = 180° sum of angles in a quadrilateral = 360°

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
18		butter = 1080 flour = 1575 sugar = 450 mincemeat = 1260	M1 for correct use of a correct scale factor, 72 ÷ 16 (= 4.5) on at least one ingredient M1 for complete method applied to all ingredients A1 correct amounts correctly converted to kg
19 a			C1 for a correct evaluation of the method shown by giving at least one correct error made, eg. "didn't multiply the 1 by 5"
b			C1 for a correct evaluation of the method shown by giving at least one correct error made, eg. "can't split a mixed number" or "should convert to improper (oe) fractions first"
20		$t = \frac{w - 11}{3}$	M1 for $3t = w - 11$ or $\frac{w}{3} = \frac{3t}{3} + \frac{11}{3}$ A1 for $t = \frac{w-11}{3}$ oe
21		Jardins of Paris	P1 correct process to convert one price to another currecncy, eg 1980 ÷ 1.34 P1 for a complete process leading to 3 prices in the same currency C1 for 3 correct and consistent results and a correct comparison made.

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
22		Mean of 96 or net deviation of 0 so target met	M1 for correct interpretation of the graph, with at least one correct reading or a line drawn through 96 with at least one correct deviation M1 complete method to find mean of six months sales, eg. (110+84+78+94+90+120)÷6 (= 96) or the mean of six deviations, C1 eg. (14–12–16–2–6+24)÷6 (= 0) for a correct answer of 96 or 0 with correct conclusion
23 a		$160 < h \leq 170$	B1 for identifying the correct class interval
b		1. Points should be plotted at mid-interval values 2. The polygon should not be closed	C1 for a correct error identified C1 for a correct error identified

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
24 a		graph	M1 for method to start to find distance cycled in 36 mins, eg. line drawn of correct gradient or $15 \times \frac{36}{60}$ C1 for correct graph from 9.00 am to 9.36 am C1 for graph drawn from "(9.36, 9)" to (10.45, "9" + 8)
b		4.5	M1 for 18×0.25 A1 cao
25		8112	M1 for complete method, eg. 7500×1.04^2 A1 cao
26		No with supporting evidence	P1 for the start of a correct process, eg. two of x, $2x$ and $2x+7$ oe or a fully correct trial, eg. 5 + 10 + 17 = 32 P1 for setting up an equation in x. eg. $x + 2x + 2x + 7 = 57$ or a correct trial totalling 57, eg. 10 + 20 + 27 = 57 C1 (dep on P2) for at least one correct result and for a correct deduction from their answers found, eg. Chris has 20 so it is impossible for all to have 20 since 60 marbles would be needed.

Paper 1MA1: 2F			
Question	**Working**	**Answer**	**Notes**
27		66.9	P1 for process to find the area of one shape, eg. 19×16 (= 304) or $\pi \times 8^2$ (= 201.06...) P1 for process to find the shaded area, eg. "304" – "201.06" ÷2 (= 203.46...) P1 for a complete process to find required percentage, eg. $\frac{"203.46"}{304} \times 100$ A1 for answer in range 66 to 68
28		43.5	P1 For process to establish a right-angled triangle with two sides of 5 cm and 9 – 7 = 2 cm P1 For correct application of Pythagoras, eg. $5^2 + "2"^2$ P1 for a complete process to find perimeter, eg. 9 + 7 + 5 + "5.39" (= 26.385...) P1 for process to find area of square, eg. $(26.385... \div 4)^2$ A1 for answer in range 43.5 to 43.6

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 3 (Calculator)

Foundation Tier

Specimen Papers Set 1	Paper Reference
Time: 1 hour 30 minutes	**1MA1/3F**

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write the number 5689 correct to the nearest thousand.

.....

(Total for Question 1 is 1 mark)

2 Work out $\frac{30 + 12}{5 + 3}$

.....

(Total for Question 2 is 1 mark)

3 Work out the reciprocal of 0.125

.....

(Total for Question 3 is 1 mark)

4 Here is a list of numbers.

1 2 5 6 12

From the list, write down

(i) a multiple of 4

.....

(ii) a prime number

.....

(Total for Question 4 is 2 marks)

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5 There are 1.5 litres of water in a bottle.

There are 250 millilitres of water in another bottle.

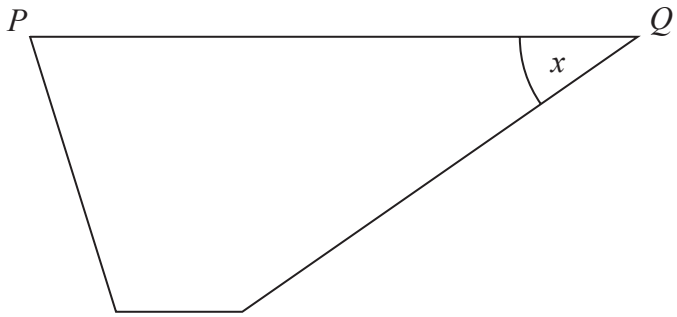
Work out the total amount of water in the two bottles.

.....

(Total for Question 5 is 3 marks)

6 Here is a trapezium.

This diagram is accurately drawn.



(a) Measure the length of the line PQ.

..... cm

(1)

(b) Measure the size of the angle marked x.

..... °

(1)

(Total for Question 6 is 2 marks)

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7 (a) Solve $f + 2f + f = 20$

$f =$ .....

(1)

(b) Solve $18 - m = 6$

$m =$ .....

(1)

(c) Simplify $d^2 \times d^3$

.....

(1)

(Total for Question 7 is 3 marks)

8 Jayne writes down the following

$$3.4 \times 5.3 = 180.2$$

Without doing the exact calculation, explain why Jayne's answer cannot be correct.

.....

.....

(Total for Question 8 is 1 mark)

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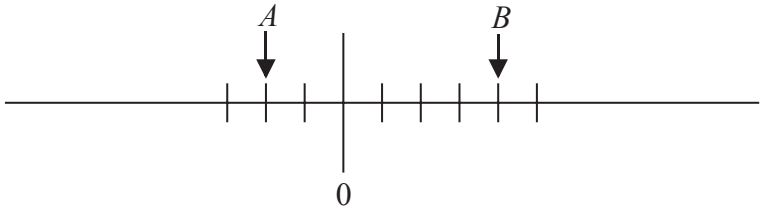
9 The two numbers, A and B, are shown on a scale.



The difference between A and B is 48

Work out the value of A and the value of B.

$A =$ .....

$B =$ .....

(Total for Question 9 is 3 marks)

10 Complete this table of values.

n	$3n + 2$
12	.....
.....	47

(Total for Question 10 is 3 marks)

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DO NOT WRITE IN THIS AREA

11 The same number is missing from each box.

$\square \times \square \times \square = 343$

(a) Find the missing number.

.....

(1)

(b) Work out 4^4

.....

(1)

(Total for Question 11 is 2 marks)

12 Here are two numbers.

29 37

Nadia says both of these numbers can be written as the **sum** of two square numbers.

Is Nadia correct?
You must show how you get your answer.

(Total for Question 12 is 3 marks)

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DO NOT WRITE IN THIS AREA

13 Here are the first three terms of a sequence.

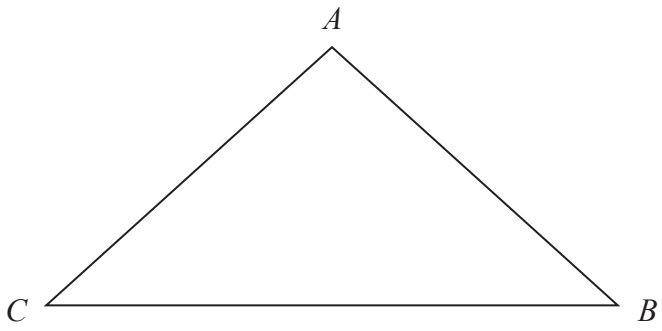
32 26 20

Find the first two terms in the sequence that are less than zero.

....

(Total for Question 13 is 3 marks)

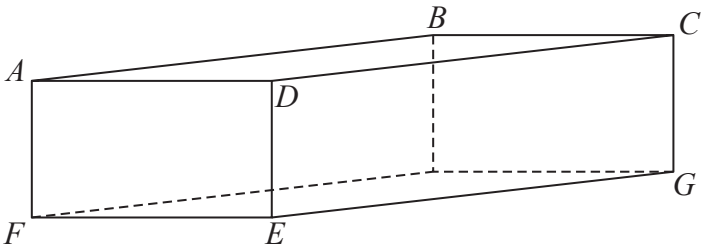
14 Here is a triangle *ABC*.



(a) Mark, with the letter *y*, the angle *CBA*.

(1)

Here is a cuboid.



Some of the vertices are labelled.

(b) Shade in the face *CDEG*.

(1)

(c) How many edges has a cuboid?

.....

(1)

(Total for Question 14 is 3 marks)

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15 There are 5 grams of fibre in every 100 grams of bread.

A loaf of bread has a weight of 400 g.
There are 10 slices of bread in a loaf.

Each slice of bread has the same weight.

Work out the weight of fibre in one slice of bread.

..... g

(Total for Question 15 is 3 marks)

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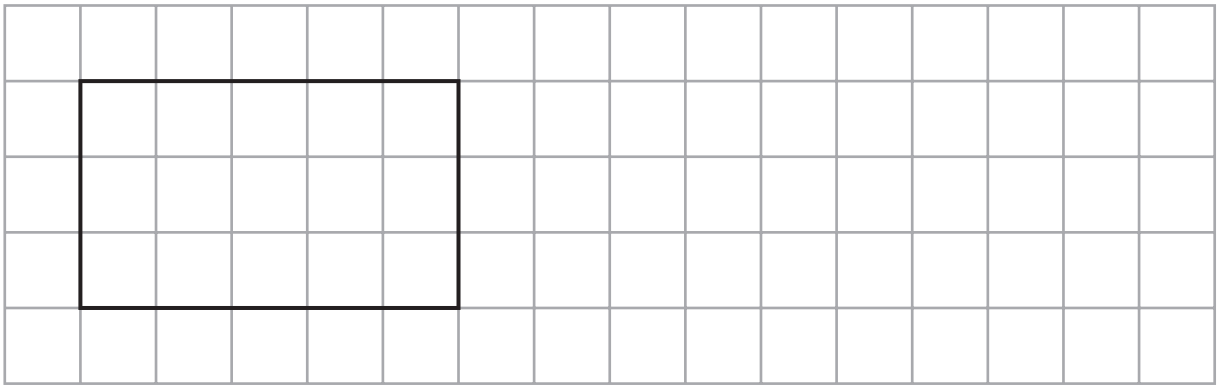
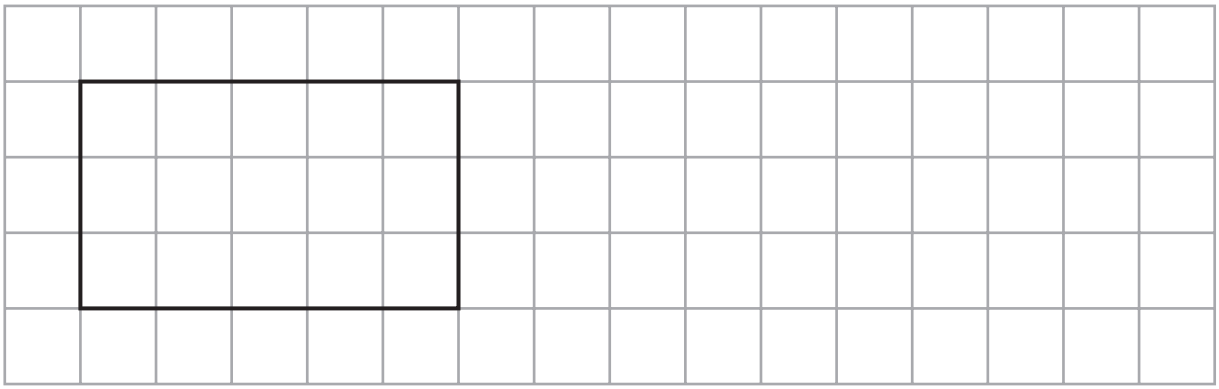
16 Give an example to show that when a piece is cut off a rectangle the perimeter of the new shape

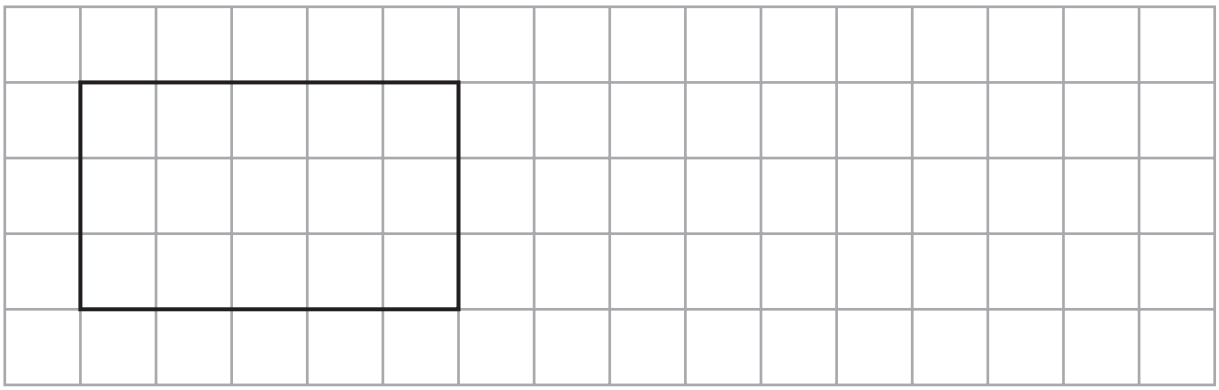
(i) is less than the perimeter of the rectangle,



(ii) is the same as the perimeter of the rectangle,



(iii) is greater than the perimeter of the rectangle.



(Total for Question 16 is 3 marks)

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17 *ABC* is an isosceles triangle.
When angle $A = 70°$, there are 3 possible sizes of angle *B*.

(a) What are they?

..... °, ... °, ... °

(3)

When angle $A = 120°$, there is only one possible size of angle *B*.

(b) Explain why.

.....

.....

(1)

(Total for Question 17 is 4 marks)

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Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Mathematics -
Specimen Papers Set 1 - September 2015 © Pearson Education Limited 2015

18 In a breakfast cereal, 40% of the weight is fruit.
The rest of the cereal is oats.

(a) Write down the ratio of the weight of fruit to the weight of oats.
Give your answer in the form 1 : *n*.

.....

(2)

A different breakfast cereal is made using only fruit and bran.
The ratio of the weight of fruit to the weight of bran is 1 : 3

(b) What fraction of the weight of this cereal is bran?

.....

(1)

(Total for Question 18 is 3 marks)

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19 Boxes of chocolates cost £3.69 each.
A shop has an offer.

Boxes of chocolates 3 for the price of 2

Ali has £50
He is going to get as many boxes of chocolates as possible.

How many boxes of chocolates can Ali get?

.....

(Total for Question 19 is 3 marks)

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DO NOT WRITE IN THIS AREA

20 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{\text{multiples of } 2\}$
$A \cap B = \{2, 6\}$
$A \cup B = \{1, 2, 3, 4, 6, 8, 9, 10\}$

Draw a Venn diagram for this information.

(Total for Question 20 is 4 marks)

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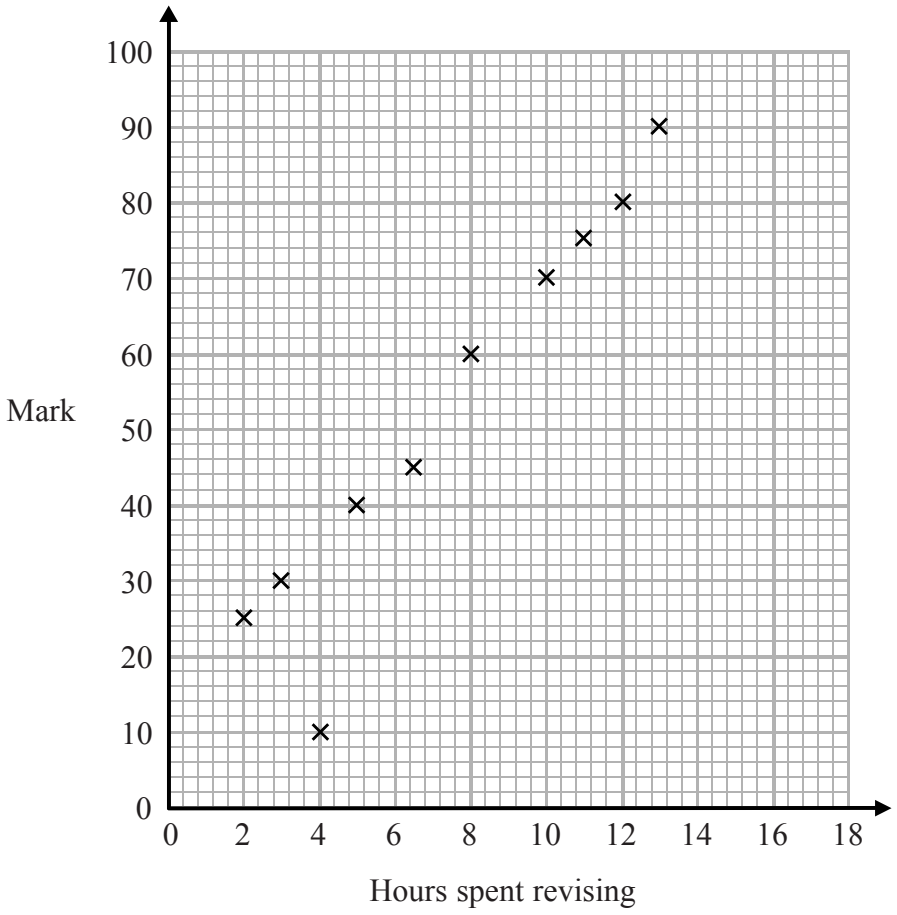
21 The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in a Spanish test.



One of the points is an outlier.

(a) Write down the coordinates of the outlier.

.....

(1)

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For all the **other** points

(b) (i) draw the line of best fit,

(ii) describe the correlation.

.....

.....

(2)

A different student revised for 9 hours.

(c) Estimate the mark this student got

.....

(1)

The Spanish test was marked out of 100

Lucia says,

"I can see from the graph that had I revised for 18 hours I would have got full marks."

(d) Comment on what Lucia says.

.....

.....

(1)

(Total for Question 21 is 5 marks)

22 The length, L cm, of a line is measured as 13 cm correct to the nearest centimetre.

Complete the following statement to show the range of possible values of L

..... $\leqslant L <$ .....

(Total for Question 22 is 2 marks)

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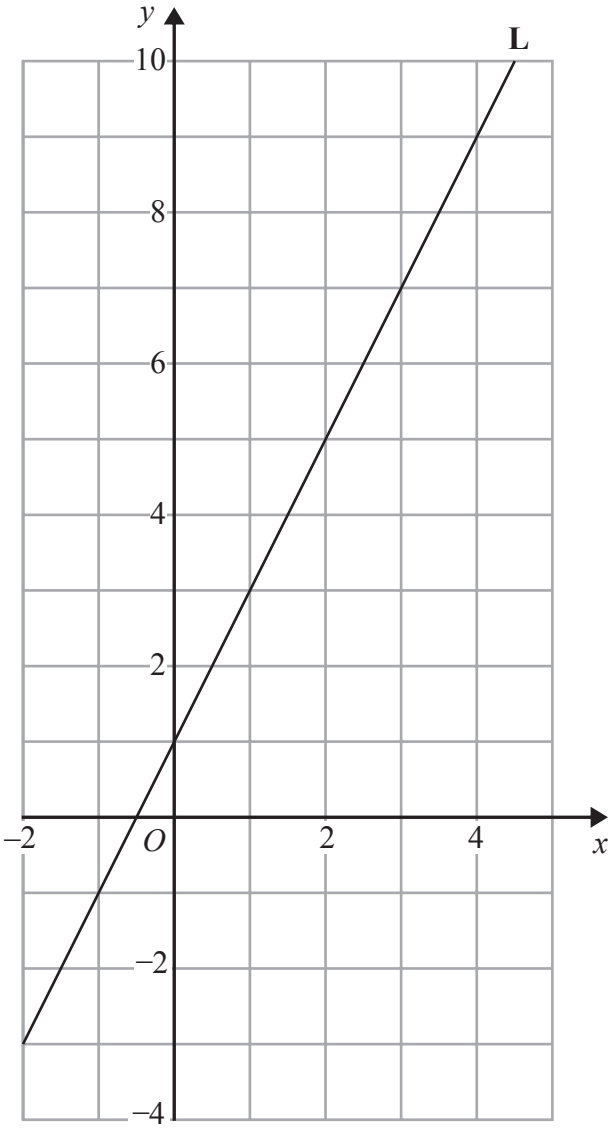
23 Line **L** is drawn on the grid below.



Find an equation for the straight line **L**.
Give your answer in the form $y = mx + c$

(Total for Question 23 is 3 marks)

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24 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

.....inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

.....

.....

(2)

(Total for Question 24 is 5 marks)

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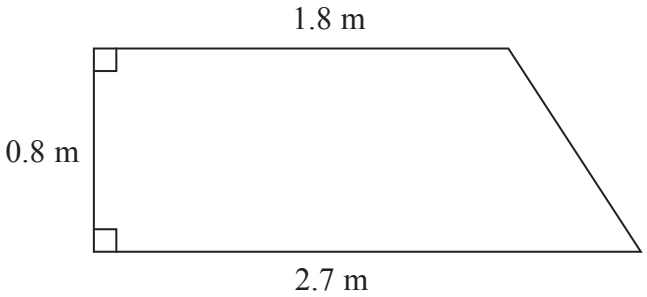
25 The diagram shows part of a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.
Each rectangular tile is 15 cm by 7.5 cm

Tiles are sold in packs.
There are 9 tiles in each pack.

Karen divides the area of the wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

(a) Use Karen's method to work out an estimate for the number of packs of tiles she needs to buy.

(5)

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Karen is advised to buy 10% more tiles than she estimated.
Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

(b) Is Karen's assumption correct?
You must show your working.

(2)

(Total for Question 25 is 7 marks)

26 Factorise $x^2 + 3x - 4$

.....

(Total for Question 26 is 2 marks)

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27 Here are the equations of four straight lines.

Line A $y = 2x + 4$
Line B $2y = x + 4$
Line C $2x + 2y = 4$
Line D $2x - y = 4$

Two of these lines are parallel.
Write down the two parallel lines.

Line ..... and line .....

(Total for Question 27 is 1 mark)

28 The densities of two different liquids A and B are in the ratio 19 : 22

The mass of 1 cm^3 of liquid B is 1.1 g.

5 cm^3 of liquid A is mixed with 15 cm^3 of liquid B to make 20 cm^3 of liquid C.

Work out the density of liquid C.

..... g/cm^3

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
1		6000	B1 cao
2		5.25	B1 cao
3		8	B1 cao
4i ii		12 2 or 5	B1 cao B1
5		1.75*l* or 1750 m*l*	B1 for knowledge of 1 litre is 1000 millilitres P1 for adding their two amounts C1 for 1.75*l* or 1750 m*l* (must include units)
6(a) 6(b)		8 35	B1 8 ±2mm B1 35 ±2°
7(a) 7(b) 7(c)		5 12 d^5	B1 cao B1 cao B1
8		Statement	C1 for a full explanation
9		–16, 32	P1 for 48 ÷ 6 P1 for a complete process to find either A or B A1

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
10		38 15	B1 cao P1 (47-2) ÷ 3 A1 cao
11(a) 11(b)		7 256	B1 cao B1 cao
12		Yes with evidence	C1 for writing down at least two squares numbers P1 for adding square numbers A1 cao with supporting evidence
13		– 4 and –10	M1 for repeated subtraction of 6 oe A1 – 4 A1 –10
14(a) 14(b) 14(c)		Angle marked Face shaded 12	B1 cao B1 cao B1 cao
15		2	P1 for correct process to find fibre for 400*g* P1 for a complete process to find the fibre per slice A1 cao
16 (i) (ii) (iii)		3 options shown	C1 Diagram with decreased perimeter drawn C1 Diagram with same perimeter drawn C1 Diagram with increased perimeter drawn

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
17(a)		70, 40 and 55	P1 for a method to find one of angles eg (180 - 70) ÷ 2 or 70 stated as the equal or 180 – 2 × 70 P1 for a method to find a angle A1 for 70, 40 and 55 (any order)
17(b)		Explanation	C1 Explanation eg only one option once an obtuse angle given
18(a)		1:1.5	M1 for 40:(100-40) A1 cao
18(b)		$\frac{3}{4}$	B1
19	3.69 × 2 = 7.38	19	P1 for 7.38 repeatedly added at least 6 times OR 50 ÷ 7.38 P1 for 6 × 7.38 + 3.69 A1 19 boxes
20		Venn diagram	M1 for two overlapping and labelled ovals M1 for 2 and 6 in the intersection M1 for 5 and 7 in the universal set only C1 for a fully correct Venn Diagram

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
21(a)		(4,10)	B1 cao
21(b)(i)		Line drawn	B1 Straight line drawn passing between (2,20) and (2,30) AND (13,86) and (13,94)
(ii)		Positive	C1 positive
21(c)		Value between 60 and 70	C1 a correct value given
21(d)		Statement	C1 for referring to the danger of extrapolation outside the given range or for a given point Eg line of best fit may not continue or full marks are hard to achieve no matter how much revision is done
22		$12.5 \leq L < 13.5$	B1 12.5 B1 13.5
23		$y = 2x + 1$	M1 for a method to find the gradient M1 for a method to find the c in $y = mx + c$ A1 $y = 2x + 1$ oe in this format
24(a)	(720+408+304+252)÷50	33.68	M1 for finding 4 products *fw* consistently within interval (including end points) M1 (dep on 1st M) for 'Σfw'÷50 A1 cao
24(b)		Manager with reasons	M1 for strategy to compare number of small size sold to number ordered C1 clear comparison that small size is not ¾ and so Jenny is not correct or the manager is correct

Paper 1MA1: 3F			
Question	**Working**	**Answer**	**Notes**
25(a)	160 tiles 18 packs	18	M1 a full method to find the area of the trapezium M1 a full method to convert all areas to consistent units M1 for the area of the trapezium ÷ area of a tile M1 for communication of the number of whole packs required A1
25(b)	176 tiles 20 packs	Supported statement	P1 finding that 10% extra requires two more packs or 10% of 18 C1Statement eg. increase in packs is 2 more which is more than 10%
26		$(x-1)(x+4)$	M1 $(x \pm 1)(x \pm 4)$ A1 $(x-1)(x+4)$ oe
27		*A* and *D*	C1 in any order
28		1.0625	P1 for a complete process to find the density of liquid A P1 for a complete process to find the mass of liquid C P1 for a complete process to find the density of liquid C A1 cao

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 1 (Non-Calculator)

Higher Tier

Specimen Papers Set 1
Time: 1 hour 30 minutes

Paper Reference
1MA1/1H

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may not be used.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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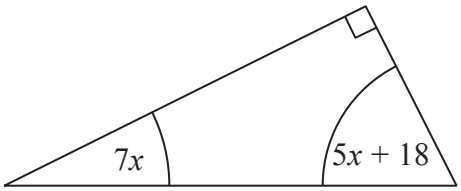
PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The diagram shows a right-angled triangle.



All the angles are in degrees.

Work out the size of the smallest angle of the triangle.

.....°

(Total for Question 1 is 3 marks)

2 A box exerts a force of 140 newtons on a table.
The pressure on the table is 35 newtons/m^2.

Calculate the area of the box that is in contact with the table.

$$p = \frac{F}{A}$$

p = pressure
F = force
A = area

.....

(Total for Question 2 is 3 marks)

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3 There are only red counters, blue counters, green counters and yellow counters in a bag.

The table shows the probabilities of picking at random a red counter and picking at random a yellow counter.

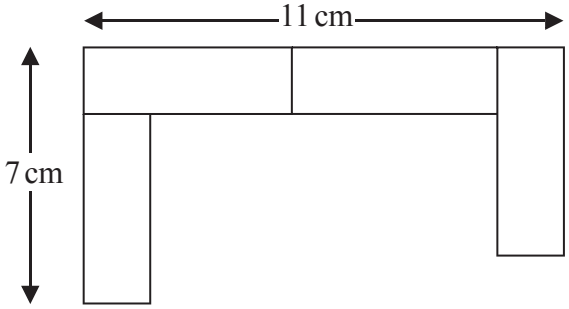
Colour	red	blue	green	yellow
Probability	0.24			0.32

The probability of picking a blue counter is the same as the probability of picking a green counter.

Complete the table.

(Total for Question 3 is 2 marks)

4 A pattern is made using identical rectangular tiles.



Find the total area of the pattern.

..... cm^2

(Total for Question 4 is 4 marks)

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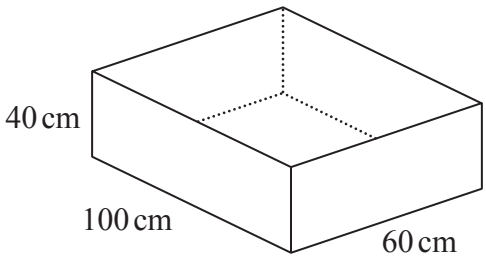
5 The diagram shows a sand pit.
The sand pit is in the shape of a cuboid.



Sally wants to fill the sand pit with sand.
A bag of sand costs £2.50
There are 8 litres of sand in each bag.

Sally says,

"The sand will cost less than £70"

Show that Sally is wrong.

(Total for Question 5 is 5 marks)

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6 Four friends each throw a biased coin a number of times.
The table shows the number of heads and the number of tails each friend got.

	Ben	**Helen**	**Paul**	**Sharif**
heads	34	66	80	120
tails	8	12	40	40

The coin is to be thrown one more time.

(a) Which of the four friends' results will give the best estimate for the probability that the coin will land heads?
Justify your answer.

.....

.....

.....

(1)

Paul says,

"With this coin you are twice as likely to get heads as to get tails."

(b) Is Paul correct?
Justify your answer.

.....

.....

.....

(2)

The coin is to be thrown twice.

(c) Use all the results in the table to work out an estimate for the probability that the coin will land heads both times.

.....

(2)

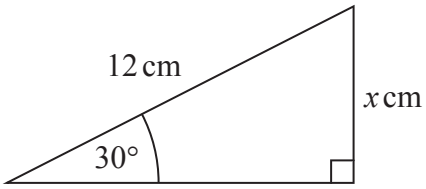
(Total for Question 6 is 5 marks)

7 (a) Write down the exact value of $\cos 30°$

.....

(1)

(b)



Given that $\sin 30° = 0.5$,
work out the value of x.

.....

(2)

(Total for Question 7 is 3 marks)

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8 The mass of Jupiter is 1.899×10^{27} kg.
The mass of Saturn is 0.3 times the mass of Jupiter.

(a) Work out an estimate for the mass of Saturn.
Give your answer in standard form.

..... kg

(3)

(b) Give evidence to show whether your answer to (a) is an underestimate or an overestimate.

.....

.....

(1)

(Total for Question 8 is 4 marks)

9 Walkden Reds is a basketball team.

At the end of 11 games, their mean score was 33 points per game.
At the end of 10 games, their mean score was 2 points higher.

Jordan says,

"Walkden Reds must have scored 13 points in their 11th game."

Is Jordan right?
You must show how you get your answer.

.....

(Total for Question 9 is 3 marks)

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10 There are some red counters and some yellow counters in a bag.
There are 30 yellow counters in the bag.
The ratio of the number of red counters to the number of yellow counters is 1 : 6

(a) Work out the number of red counters in the bag.

.....

(2)

Riza puts some more red counters into the bag.
The ratio of the number of red counters to the number of yellow counters is now 1 : 2

(b) How many red counters does Riza put into the bag?

.....

(2)

(Total for Question 10 is 4 marks)

11 Write down the value of $125^{\frac{2}{3}}$

.....

(Total for Question 11 is 1 mark)

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12 Sean drives from Manchester to Gretna Green.

He drives at an average speed of 50 mph for the first 3 hours of his journey.

He then has 150 miles to drive to get to Gretna Green.
Sean drives these 150 miles at an average speed of 30 mph.

Sean says,

"My average speed from Manchester to Gretna Green was 40 mph."

Is Sean right?
You must show how you get your answer.

(Total for Question 12 is 4 marks)

13 $m = \sqrt{\dfrac{k^3 + 1}{4}}$

Make k the subject of the formula.

(Total for Question 13 is 3 marks)

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14 Solve $\frac{x+2}{3x} + \frac{x-2}{2x} = 3$

$x =$ .....

(Total for Question 14 is 3 marks)

15 Show that $\frac{2x^2 - 3x - 5}{x^2 + 6x + 5}$ can be written in the form $\frac{ax + b}{cx + d}$ where a, b, c and d are integers.

(Total for Question 15 is 3 marks)

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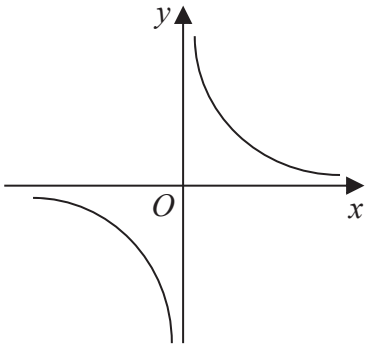
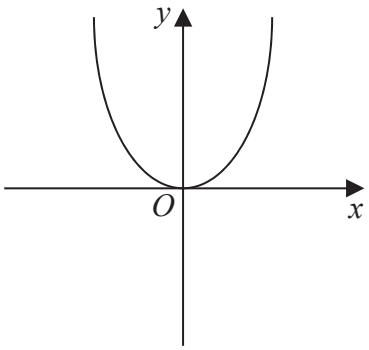
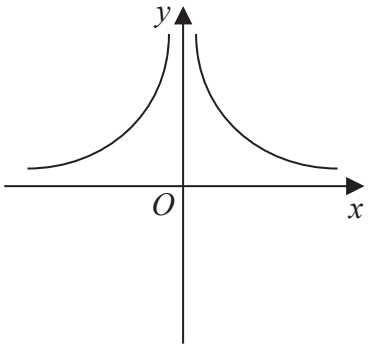
16 These graphs show four different proportionality relationships between y and x.



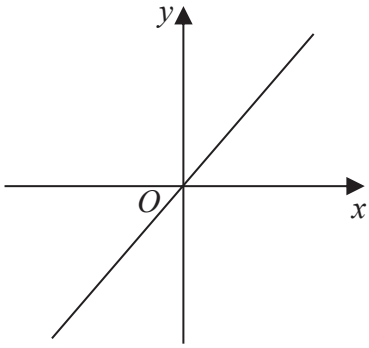
Graph A



Graph B



Graph C



Graph D

Match each graph with a statement in the table below.

Proportionality relationship	**Graph letter**
y is directly proportional to x	
y is inversely proportional to x	
y is proportional to the square of x	
y is inversely proportional to the square of x	

(Total for Question 16 is 2 marks)

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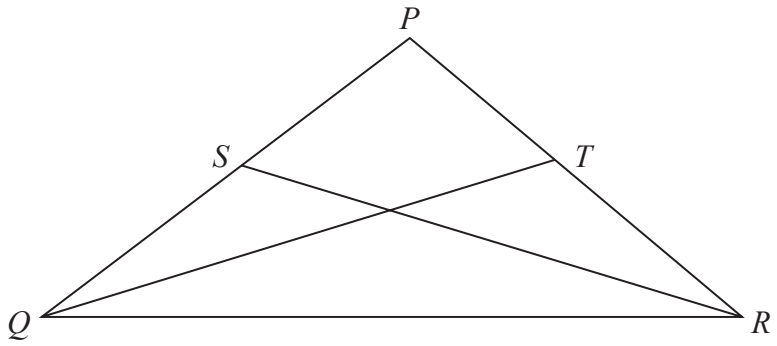
17



$PQ = PR$.
S is the midpoint of PQ.
T is the midpoint of PR.

Prove triangle QTR is congruent to triangle RSQ.

(Total for Question 17 is 3 marks)

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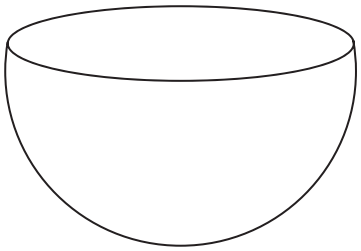
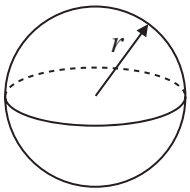
18 The diagram shows a solid hemisphere.



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

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



The volume of the hemisphere is $\frac{250}{3}\pi$

Work out the exact total surface area of the solid hemisphere.
Give your answer as a multiple of π.

..... cm^2

(Total for Question 18 is 4 marks)

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19 Simplify fully $\frac{(6-\sqrt{5})(6+\sqrt{5})}{\sqrt{31}}$

You must show your working.

(Total for Question 19 is 3 marks)

20 Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

(Total for Question 20 is 4 marks)

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21 There are 10 pens in a box.

There are x red pens in the box.
All the other pens are blue.

Jack takes at random two pens from the box.

Find an expression, in terms of x, for the probability that Jack takes one pen of each colour.
Give your answer in its simplest form.

.....

(Total for Question 21 is 5 marks)

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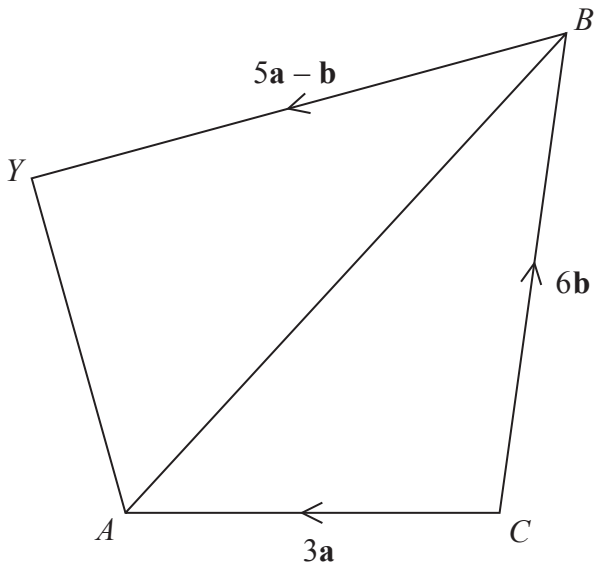
22



CAYB is a quadrilateral.

$\overrightarrow{CA} = 3\mathbf{a}$
$\overrightarrow{CB} = 6\mathbf{b}$
$\overrightarrow{BY} = 5\mathbf{a} - \mathbf{b}$

X is the point on *AB* such that $AX : XB = 1 : 2$

Prove that $\overrightarrow{CX} = \frac{2}{5}\overrightarrow{CY}$

(Total for Question 22 is 5 marks)

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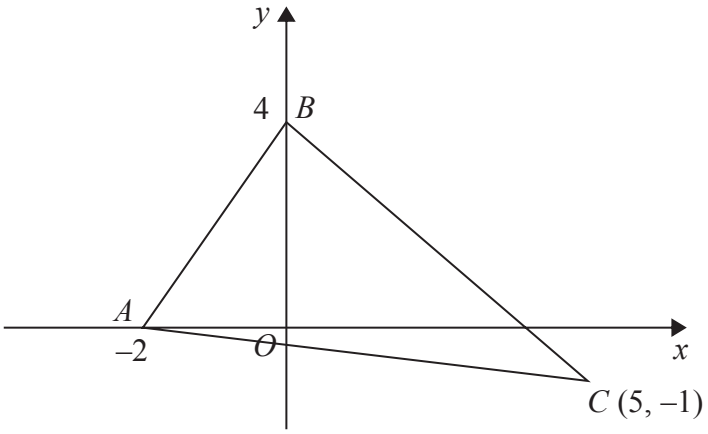
23



Find an equation of the line that passes through C and is perpendicular to AB.

(Total for Question 23 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 1H				
Question	**Working**	**Answer**	**Notes**	
1		42	P1 process to start problem solving eg forms an appropriate equation P1 complete process to solve equation A1 cao	
2		4 m^2	B1 substitution into formula eg $1.5 = \frac{12}{A}$ A1 4 (oe) stated C1 (indep) units stated	
3		0.22	P1 begins process of subtraction of probabilities from 1 A1 oe	
4		48	P1 begins to work with rectangle dimensions eg $l+w=7$ or $2\times l+w$ (=11) C1 shows a result for a dimension eg using $l=4$ or $w=3$ P1 begins process of finding total area eg 4 × "3" × "4" A1 cao	
5		explanation	M1 works with volume eg 240000 M1 uses conversion 1 litre = 1000 cm^3 M1 uses 8000 eg vol ÷ 8000 (=30) M1 uses "30" eg "30" × 2.50 C1 for explanation and 75 stated	begins working back eg 70÷2.50 uses conversion 1 litre = 1000 cm^3 uses 8000 eg "28"× 8000 (=224000) works with vol. eg 224000 for explanation with 240000 and 224000

Paper 1MA1: 1H				
Question	**Working**	**Answer**	**Notes**	
6 (a)		Sharif	B1	Sharif with mention of greatest total throws
(b)		No (supported)	P1	starts working with proportions
			A1	Conclusion: correct for Paul, but not for the rest; or ref to just Paul's results
(c)	Tot: H 300 T 100	$\frac{9}{16}$	P1	selects Sharif or overall and multiplies P(heads)×P(heads) eg ¾ × ¾
			A1	oe
7 (a)		$\frac{\sqrt{3}}{2}$	B1	
(b)		6	M1	starts process eg $\sin 30 = \frac{x}{12}$
			A1	answer given
8 (a)		5.7×10^{26} to 6×10^{26}	B1	uses estimates eg 1.899 to 1.9 or 2
			M1	process of multiplication eg 0.57×10^{27}
			A1	between 5.7×10^{26} and 6×10^{26}
(b)		explanation	C1	eg underestimate a number is rounded up
9		'Yes' with correct working	P1	begins process of working with mean eg 35×10 (=350) or 33×11 (=363) or 10×(35−33) (=20) or 11×(35−33) (=22)
			P1	(dep) finding the difference eg "363"−"350", or 33 – "20" or 35 – "22"
			C1	'Yes' with 13 from correct working

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
10 (a)		5	P1 begins to work with scaling factors (eg 5) or ÷6 A1 cao
(b)		10	P1 works with 1:2 ratio eg no. red counters is 30÷2 (=15) A1 ft
11		25	B1 cao
12		37.5 mph	P1 shows process of finding first distance eg 50 × 3 (=150) P1 shows process of finding time for second part eg 150 ÷ 30 (=5 h) P1 shows process of working with av sp. (dist ÷ time) (= 300÷(3+5) = 300÷8) C1 conclusion with supporting evidence, correct notation and units eg 37.5 mph
13		$k = \sqrt[3]{4m^2 - 1}$ or $\sqrt[3]{(2m+1)(2m-1)}$	M1 clear fractions or remove sq rt sign M1 (dep) clear fractions and remove sq rt sign A1 $k = \sqrt[3]{4m^2 - 1}$ or $\sqrt[3]{(2m+1)(2m-1)}$
14		$\frac{-2}{13}$	M1 multiplies all terms by 2 or 3 to reconcile fractions M1 complete process of expanding brackets and isolating x term A1 cao
15		$\frac{2x-5}{x+5}$	M1 factorising to give $(2x - 5)(x + 1)$ M1 factorising to give $(x + 5)(x + 1)$ A1 cao

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
16		D, A, B, C	B1 for at least 2 correct B1 for all correct
17		SAS	M1 links PQR and PRQ (eg isosceles triangle) with full reasons M1 links TR and SQ with full reasons C1 gives full conclusion for congruency eg SAS
18		75π	P1 starts process by using $\frac{250}{3}\pi$ and $\frac{1}{2}\times\frac{4}{3}\pi r^3$ to find radius as 5 P1 starts process using ½ curved surface area eg $(4 \times \pi \times 5^2) \div 2$ P1 complete process shown eg $(4 \times \pi \times 5^2) \div 2 + (\pi \times 5^2)$ A1 for 75π
19		$\sqrt{31}$	M1 expands brackets eg $36 + 6\sqrt{5} - 6\sqrt{5} - \sqrt{25}$ (=31) M1 rationalises the denominator eg using $\sqrt{31}$ with numerator & denominator A1 for $\sqrt{31}$

Paper 1MA1: 1H					
Question	**Working**	**Answer**	**Notes**		
20		proof (supported)	M1 M1 A1 C1	for any two consecutive integers expressed algebraically eg $n + 1$ and n (dep) for the difference between the squares of "two consecutive integers" expressed algebraically eg $(n + 1)^2 - n^2$ for correct expansion and simplification of difference of squares eg $2n + 1$ for showing statement is correct (with supportive evidence) eg $n + n + 1 = 2n + 1$ and $(n + 1)^2 - n^2 = 2n + 1$	for sight of $p^2 - q^2 = (p - q)(p + q)$ for deduction that $p - q = 1$ for linking these two statements eg substitution of 1 for $p - q$ for fully stated proof and deduction eg $p^2 - q^2 = 1 \times (p + q) = p + q$
21		$\frac{10x - x^2}{45}$	P1 P1 P1 P1 A1	for $\frac{x}{10}$ or $\frac{10-x}{10}$ or $\frac{x-1}{9}$ or $\frac{10-x}{9}$ or $\frac{x}{9}$ or $\frac{9-x}{9}$ seen on diagram or in a calculation for $\frac{x}{10} \times \frac{10-x}{9}$ or $\frac{10-x}{10} \times \frac{x}{9}$ for $\frac{x}{10} \times \frac{10-x}{9} + \frac{10-x}{10} \times \frac{x}{9}$ for beginning to process the algebra $\frac{10x - x^2}{45}$ oe	for $\frac{x}{10} \times \frac{x-1}{9} + \frac{10-x}{10} \times \frac{9-x}{9}$ for $1 - (\frac{x}{10} \times \frac{x-1}{9} + \frac{10-x}{10} \times \frac{9-x}{9})$

Paper 1MA1: 1H			
Question	**Working**	**Answer**	**Notes**
22			M1 states AB as $6\mathbf{b} - 3\mathbf{a}$ M1 for $AX = \frac{1}{3}AB$ or $\frac{1}{3}$"$(6\mathbf{b} - 3\mathbf{a})$" or ft to $2\mathbf{b} - \mathbf{a}$ M1 for $\overrightarrow{CY} = \overrightarrow{CB} + \overrightarrow{BY} = 6\mathbf{b} + 5\mathbf{a} - \mathbf{b}$ $(=5\mathbf{b} + 5\mathbf{a})$ M1 for $\overrightarrow{CX} = 3\text{a} +$ "2b – a" or $\overrightarrow{CX} = 6\text{b} - \frac{2}{3}$"$(6\mathbf{b} - 3\mathbf{a})$" $(= 2\mathbf{a} + 2\mathbf{b})$ C1 for $\frac{2}{5}\overrightarrow{CY} = \frac{2}{5}(5\mathbf{a} + 5\mathbf{b}) = 2(\mathbf{a} + \mathbf{b}) = \overrightarrow{CX}$
23		$y = -\frac{1}{2}x + \frac{3}{2}$	P1 for a process to find the gradient of the line AB P1 (dep) for a process to find the gradient of a perpendicular line eg use of $-1/m$ P1 (dep on P2) for substitution of $x=5$, $y=-1$ A1 equation stated oe

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 2 (Calculator)

Higher Tier

Specimen Papers Set 1	Paper Reference
Time: 1 hour 30 minutes	**1MA1/2H**

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Make t the subject of the formula $w = 3t + 11$

.....

(Total for Question 1 is 2 marks)

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2 Three companies sell the same type of furniture.

The price of the furniture from Pooles of London is £1480
The price of the furniture from Jardins of Paris is €1980
The price of the furniture from Outways of New York is $2250

The exchange rates are

£1 = €1.34

£1 = $1.52

Which company sells this furniture at the lowest price?
You must show how you get your answer.

(Total for Question 2 is 3 marks)

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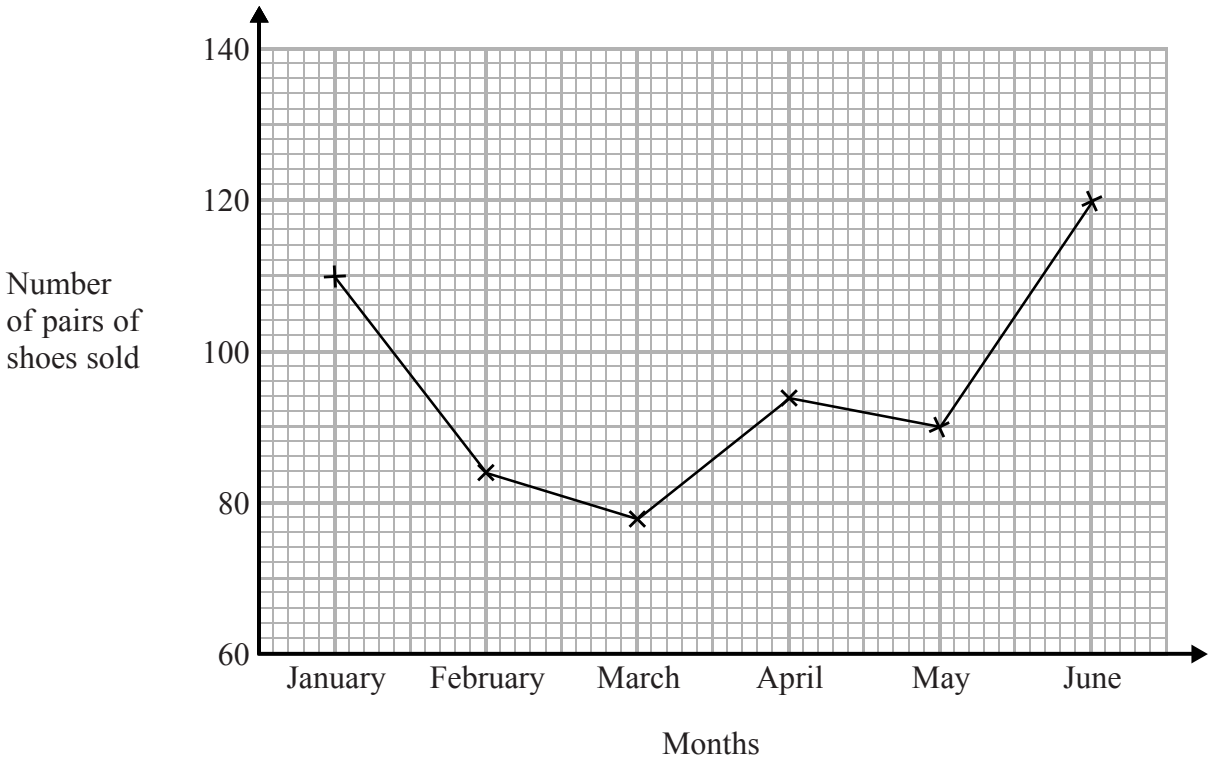
3 The time-series graph gives some information about the number of pairs of shoes sold in a shoe shop in the first six months of 2014



The sales target for the first six months of 2014 was to sell a mean of 96 pairs of shoes per month.

Did the shoe shop meet this sales target?
You must show how you get your answer.

(Total for Question 3 is 3 marks)

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4 The grouped frequency table gives information about the heights of 30 students.

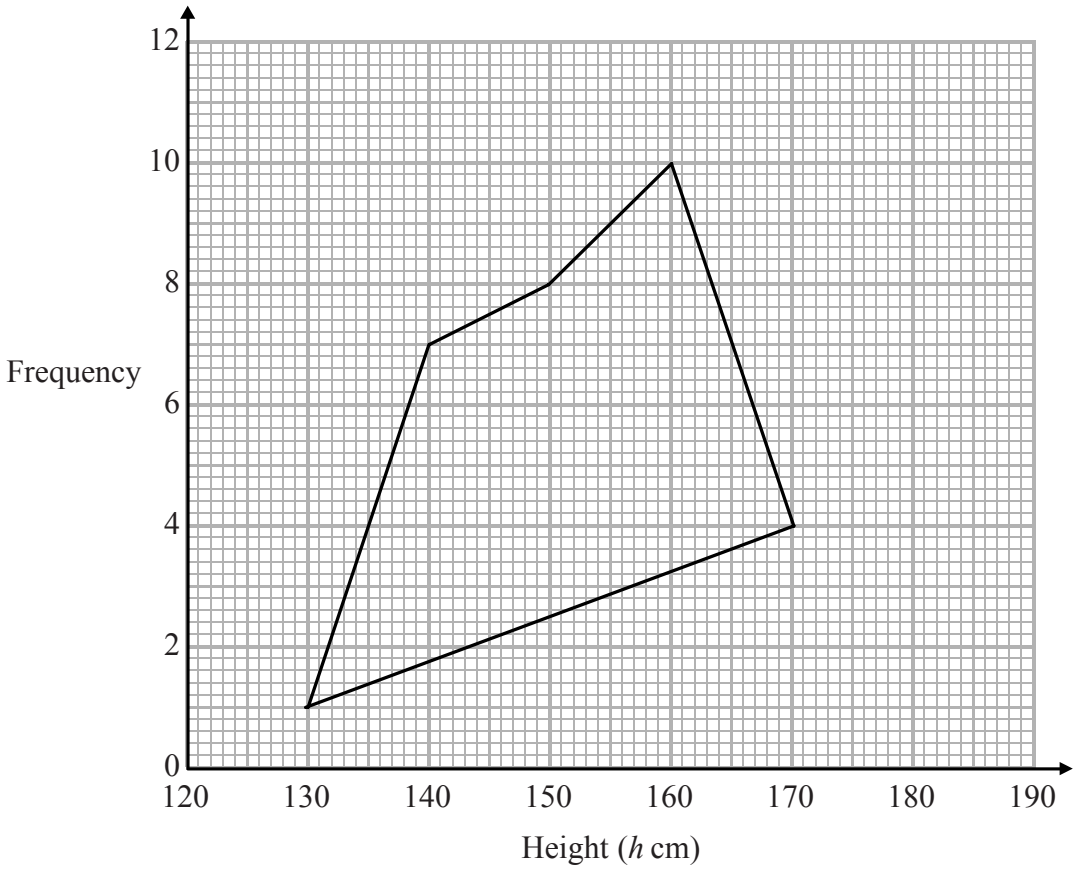
Height (h cm)	Frequency
$130 < h \leqslant 140$	1
$140 < h \leqslant 150$	7
$150 < h \leqslant 160$	8
$160 < h \leqslant 170$	10
$170 < h \leqslant 180$	4

(a) Write down the modal class interval.

.....

(1)

This incorrect frequency polygon has been drawn for the information in the table.



(b) Write down two things wrong with this incorrect frequency polygon.

1 .....

2 .....

(2)

(Total for Question 4 is 3 marks)

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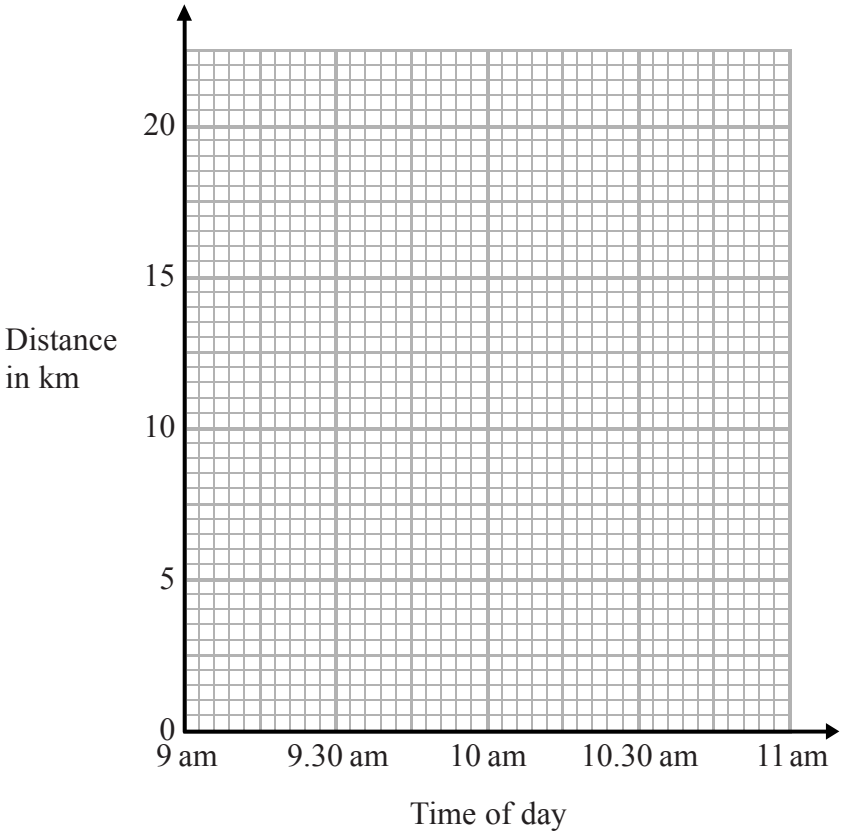
5 At 9 am, Bradley began a journey on his bicycle.

From 9 am to 9.36 am, he cycled at an average speed of 15 km/h.
From 9.36 am to 10.45 am, he cycled a further 8 km.

(a) Draw a travel graph to show Bradley's journey.



(3)

From 10.45 am to 11 am, Bradley cycled at an average speed of 18 km/h.

(b) Work out the distance Bradley cycled from 10.45 am to 11 am.

..... km

(2)

(Total for Question 5 is 5 marks)

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6 Toby invested £7500 for 2 years in a savings account.
He was paid 4% per annum compound interest.

How much money did Toby have in his savings account at the end of 2 years?

£ .....

(Total for Question 6 is 2 marks)

7 Becky has some marbles.
Chris has two times as many marbles as Becky.
Dan has seven more marbles than Chris.

They have a total of 57 marbles.

Dan says,
"If I give some marbles to Becky, each of us will have the same number of marbles."

Is Dan correct?
You must show how you get your answer.

(Total for Question 7 is 3 marks)

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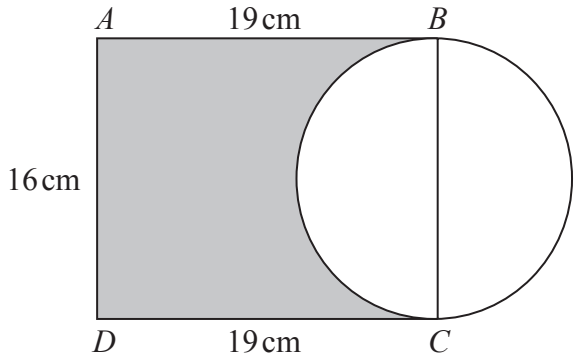
8 Here is a diagram showing a rectangle, *ABCD*, and a circle.



BC is a diameter of the circle.

Calculate the percentage of the area of the rectangle that is shaded.
Give your answer correct to 1 decimal place.

.....%

(Total for Question 8 is 4 marks)

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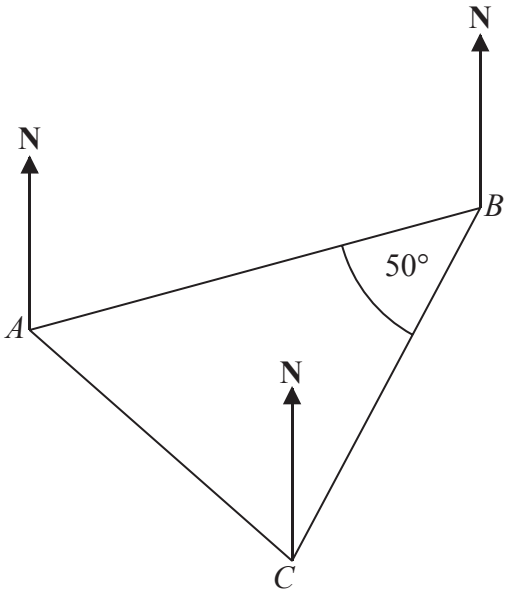
9 The diagram shows the positions of three points, A, B and C, on a map.



The bearing of B from A is 070°

Angle ABC is 50°
$AB = CB$

Work out the bearing of C from A.

.....°

(Total for Question 9 is 3 marks)

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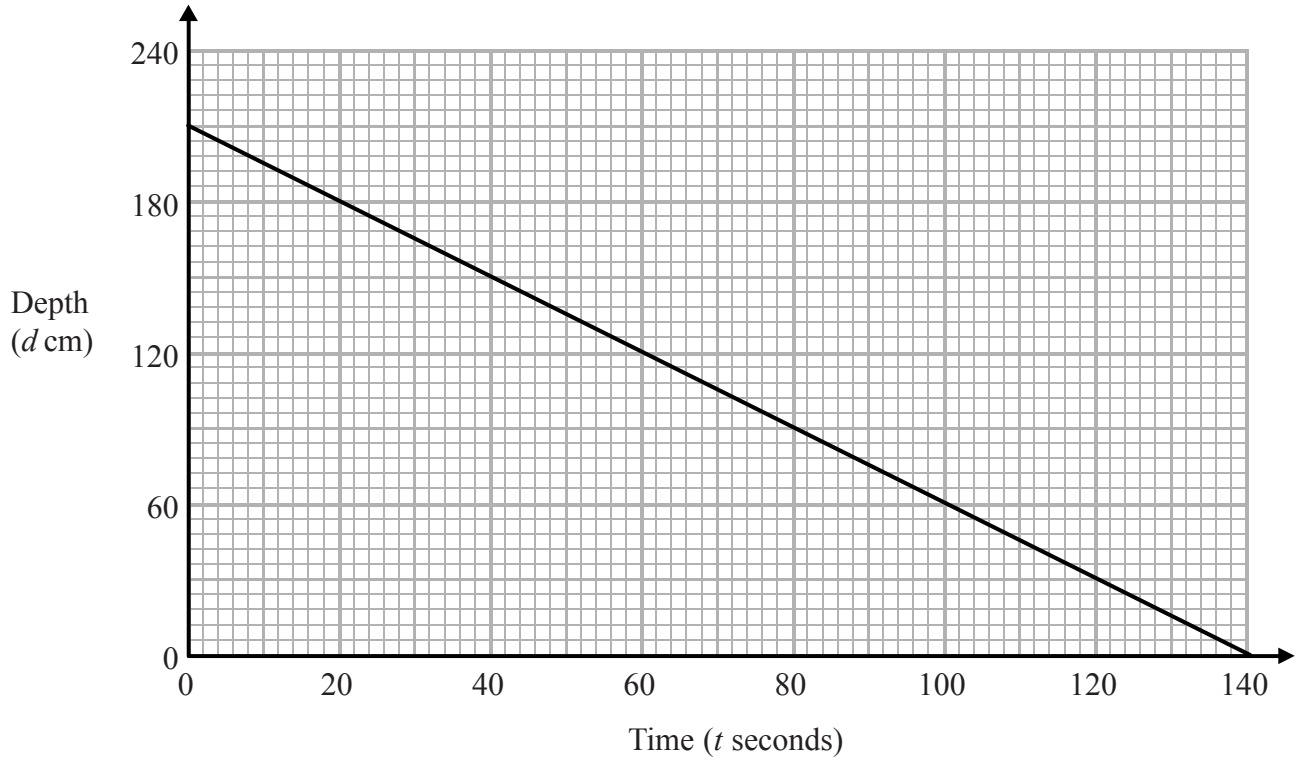
10 The graph shows the depth, d cm, of water in a tank after t seconds.



(a) Find the gradient of this graph.

.....

(2)

(b) Explain what this gradient represents.

.....

.....

(1)

(Total for Question 10 is 3 marks)

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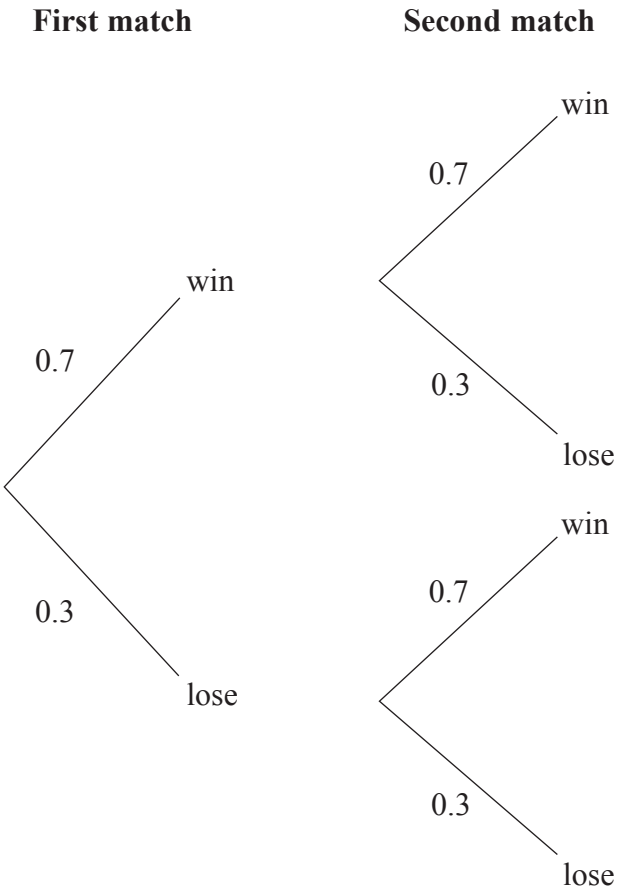
11 Finlay plays two tennis matches.

The probability that he will win a match and the probability that he will lose a match are shown in the probability tree diagram.



(a) Work out the probability that Finlay wins both matches.

(2)

(b) Work out the probability that Finlay loses at least one match.

(2)

(Total for Question 11 is 4 marks)

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12 (a) Find the reciprocal of 2.5

.....

(1)

(b) Work out $\sqrt[3]{\dfrac{4.3 \times \tan 39^\circ}{23.4 - 6.06}}$

Give your answer correct to 3 significant figures.

.....

(2)

(Total for Question 12 is 3 marks)

13 Show that

$$(3x - 1)(x + 5)(4x - 3) = 12x^3 + 47x^2 - 62x + 15$$

for all values of x.

(Total of Question 13 is 3 marks)

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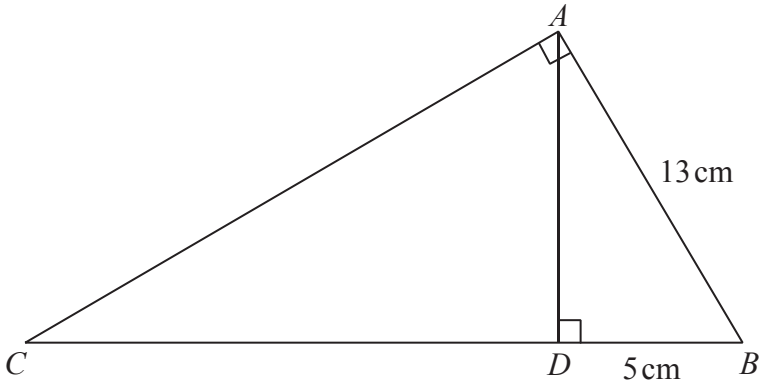
14 *ABC* and *ABD* are two right-angled triangles.



Angle *BAC* = angle *ADB* = 90°

AB = 13 cm
DB = 5 cm

Work out the length of *CB*.

..... cm

(Total for Question 14 is 3 marks)

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15 A pendulum of length L cm has time period T seconds.
T is directly proportional to the square root of L.

The length of the pendulum is increased by 40%.

Work out the percentage increase in the time period.

.....%

(Total for Question 15 is 3 marks)

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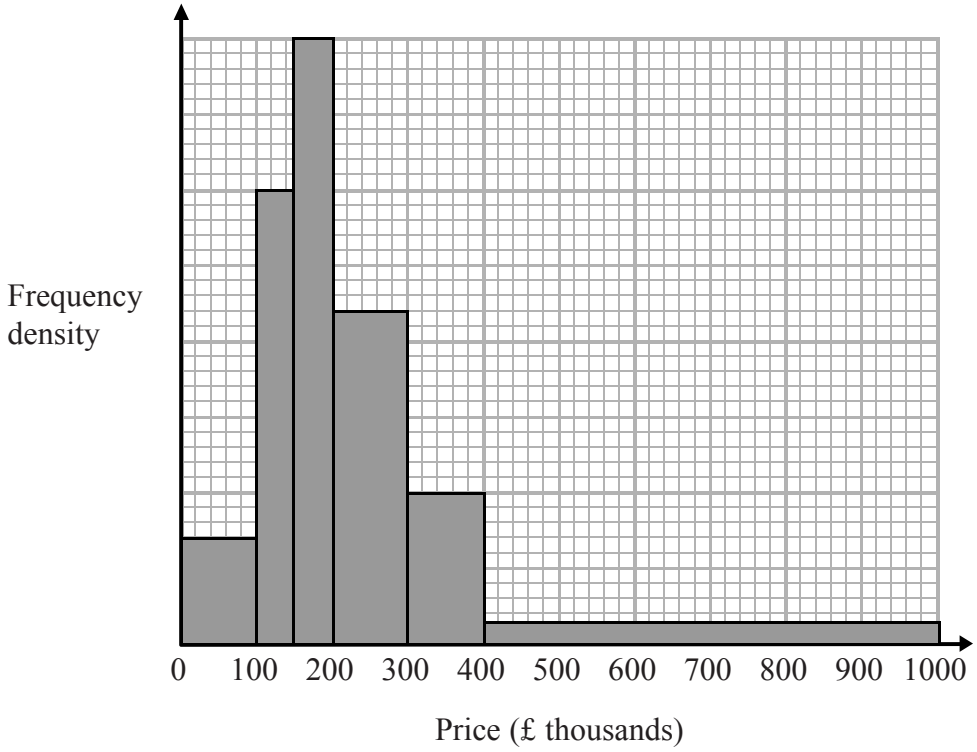
16 The histogram gives information about house prices in a village in 2015



20 houses in the village have a price between £300 000 and £400 000

Work out the number of houses in the village with a price under £200 000

.....

(Total for Question 16 is 3 marks)

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17 Here are the first 5 terms of a quadratic sequence.

1 3 7 13 21

Find an expression, in terms of n, for the nth term of this quadratic sequence.

(Total for Question 17 is 3 marks)

18 $f(x) = 3x^2 - 2x - 8$

Express $f(x + 2)$ in the form $ax^2 + bx$

(Total for Question 18 is 3 marks)

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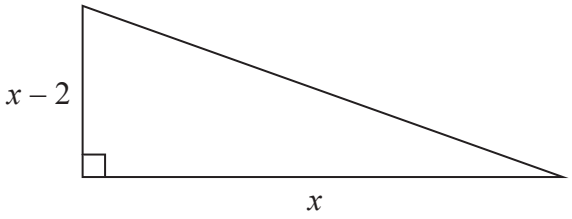
19 Here is a right-angled triangle.



All measurements are in centimetres.
The area of the triangle is 2.5 cm^2.

Find the perimeter of the triangle.
Give your answer correct to 3 significant figures.
You must show all of your working.

..... cm

(Total for Question 19 is 6 marks)

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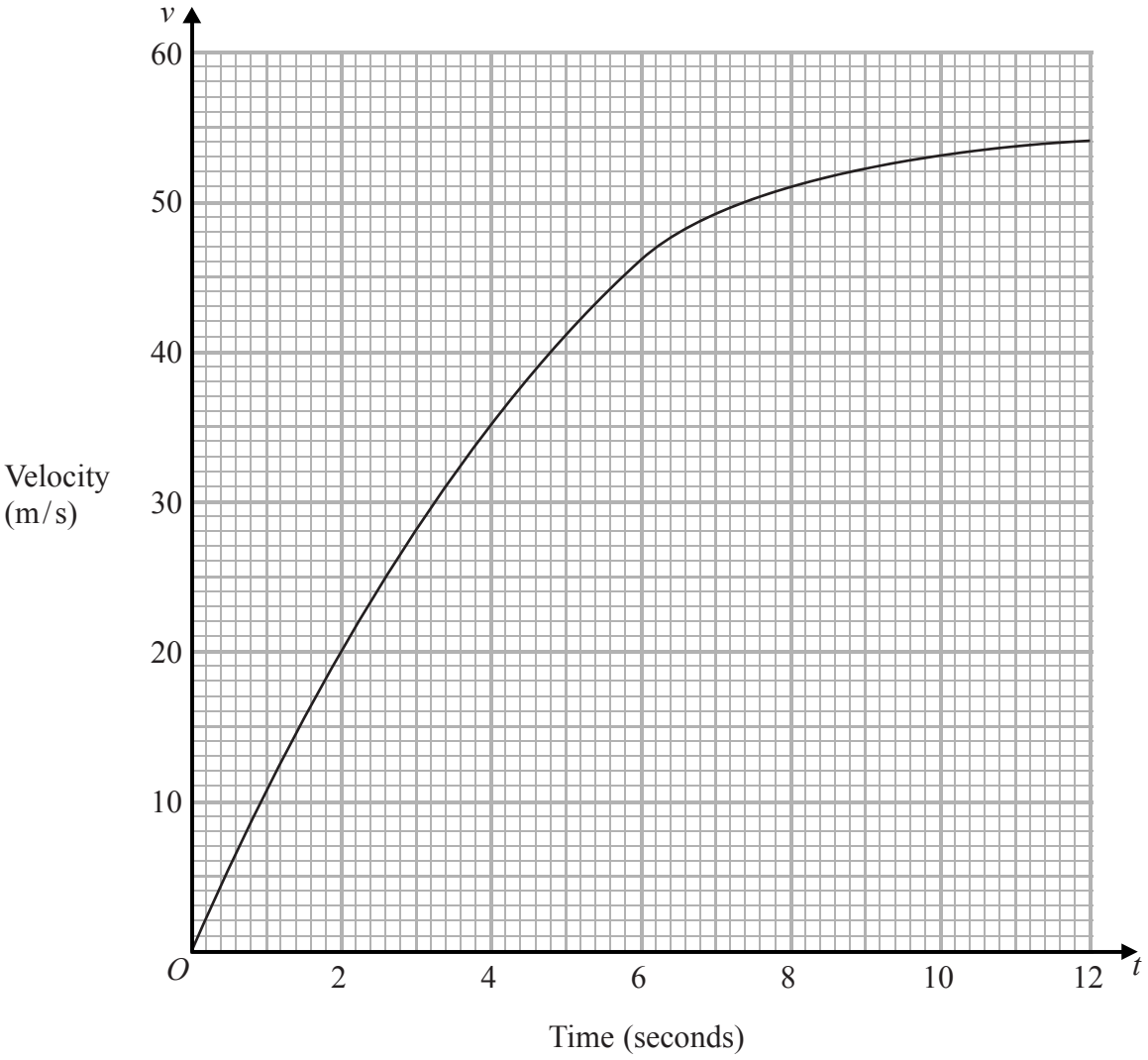
20 The graph shows information about the velocity, v m/s, of a parachutist t seconds after leaving a plane.



(a) Work out an estimate for the acceleration of the parachutist at $t = 6$

..... m/s^2

(2)

(b) Work out an estimate for the distance fallen by the parachutist in the first 12 seconds after leaving the plane.
Use 3 strips of equal width.

..... m

(3)

(Total for Question 20 is 5 marks)

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21 The number of bees in a beehive at the start of year n is P_n.
The number of bees in the beehive at the start of the following year is given by

$$P_{n+1} = 1.05(P_n - 250)$$

At the start of 2015 there were 9500 bees in the beehive.

How many bees will there be in the beehive at the start of 2018?

.....

(Total for Question 21 is 3 marks)

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22 $D = \dfrac{x}{y}$

x = 99.7 correct to 1 decimal place.
y = 67 correct to 2 significant figures.

Work out an upper bound for D.

.....

(Total for Question 22 is 3 marks)

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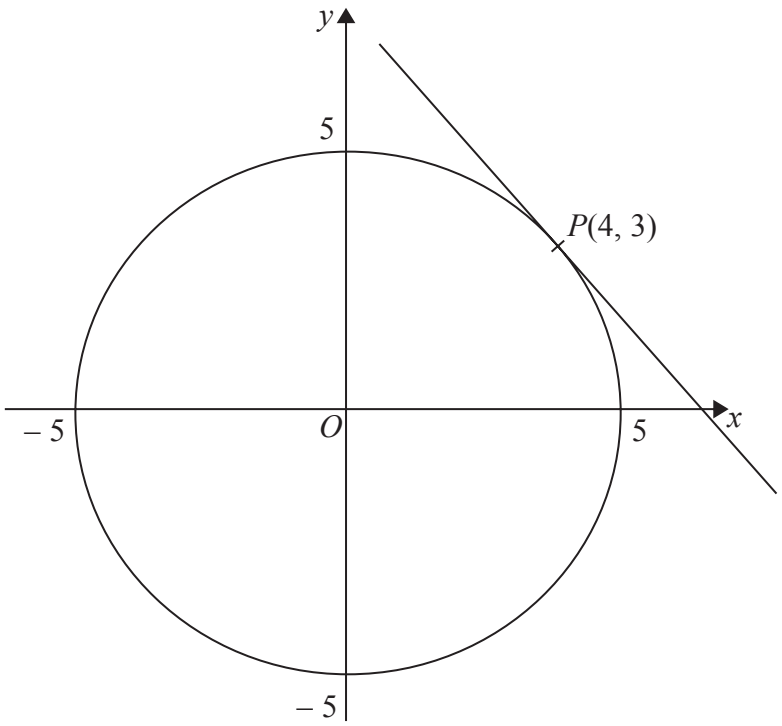
23 Here is a circle, centre O, and the tangent to the circle at the point $P(4, 3)$ on the circle.



Find an equation of the tangent at the point P.

(Total for Question 23 is 3 marks)

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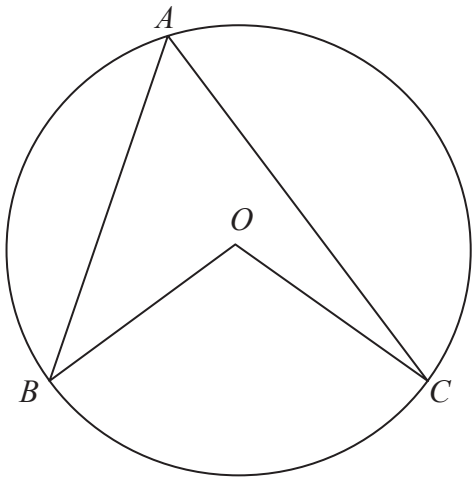
24 A, B and C are points on the circumference of a circle centre O.



Prove that angle BOC is twice the size of angle BAC.

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
1		$t = \frac{w - 11}{3}$	M1 For isolating term in t, eg. $3t = w - 11$ or dividing all terms by 3, eg. $\frac{w}{3} = \frac{3t}{3} + \frac{11}{3}$ A1 for $t = \frac{w-11}{3}$ oe
2		Jardins of Paris	P1 correct process to convert one price to another currecncy, eg 1980 ÷ 1.34 P1 for a complete process leading to 3 prices in the same currency C1 for 3 correct and consistent results and a correct comparison made.
3		Mean of 96 or net deviation of 0 so target met	M1 for correct interpretation of the graph, with at least one correct reading or a line drawn through 96 with at least one correct deviation M1 complete method to find mean of six months sales, eg. (110+84+78+94+90+120)÷6 (= 96) or the mean of six deviations, C1 eg. (14–12–16–2–6+24)÷6 (= 0) for a correct answer of 96 or 0 with correct conclusion

Paper 1MA1: 2H				
Question	**Working**	**Answer**	**Notes**	
4 a		$160 < h \leq 170$	B1	for identifying the correct class interval
b		1. Points should be plotted at mid-interval values 2. The polygon should not be closed	C1 C1	for a correct error identified for a correct error identified
5 a		graph	M1 C1 C1	for method to start to find distance cycled in 36 mins, eg. line drawn of correct gradient or $15 \times \frac{36}{60}$ for correct graph from 9.00 am to 9.36 am for graph drawn from "(9.36, 9)" to (10.45, "9" + 8)
b		4.5	M1 A1	for 18 × 0.25oe cao
6		8112	M1 A1	for complete method, eg. 7500×1.04^2 cao

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
7		No with supporting evidence	P1 for the start of a correct process, eg. two of x, $2x$ and $2x+7$ oe or a fully correct trial, eg. 5 + 10 + 17 = 32 P1 for setting up an equation in x. eg. $x + 2x + 2x + 7 = 57$ or a correct trial totalling 57, eg. 10 + 20 + 27 = 57 C1 (dep on P2) for at least one correct result and for a correct deduction from their answers found, eg. Chris has 20 so it is impossible for all to have 20 since 60 marbles would be needed.
8		66.9	P1 for process to find the area of one shape, eg. 19×16 (= 304) or $\pi \times 8^2$ (= 201.06...) P1 for process to find the shaded area, eg. "304" – "201.06" ÷2 (= 203.46...) P1 for a complete process to find required percentage, eg. $\frac{"203.46"}{304} \times 100$ A1 for answer in range 66 to 68
9		135	B1 for identifying the angle of 70^o (on the diagram), showing understanding of notation P1 for process to find an angle in triangle *ABC,* eg. for process to find angle *BAC*, eg. (180 – 50) ÷ 2 (= 65^o) A1 for 135

Paper 1MA1: 2H				
Question	**Working**	**Answer**	**Notes**	
10 a		–1.5	M1 A1	for method to find gradient, eg. 210 ÷ 140 for correct interpretation of the negative gradient
b			C1	for explanation, eg. rate of change of depth of water in tank
11 a		0.49	M1 A1	for 0.7 × 0.7 for 0.49 oe
b		0.51	M1 A1	for a correct process, eg. 1 – "0.49" or 0.7 × 0.3 + 0.3× 0.7 + 0.3 × 0.3 for 0.51 oe
12 a		0.4	B1	For 0.4 oe
b		0.586	B1 B1	for 3.48207..... or 17.34 or 0.200811... for 0.585 to 0.586
13		Fully correct algebra to show given result	M1 M1 A1	for method to find the product of any two linear expressions; eg. 3 correct terms or 4 terms ignoring signs for method of 6 products, 4 of which are correct (ft their first product) for fully accurate working to give the required result

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
14		33.8	P1 for recognition of similar triangles or equal ratio of sides P1 for process to find CB, eg. $\frac{5}{13} = \frac{13}{CB}$ A1 for 33.8
15		18.3	P1 for a start to the process interpreting the information correctly, eg. $T = k\sqrt{L}$ oe P1 for next stage in process to find percentage change in T, eg. $\sqrt{1.4}$ A1 for 18.3 to 18.4
16		84	M1 for correct interpretation of given information leading to a method to find fd, eg. 20 ÷ 100 (thousand) P1 for start of process to find required frequency, eg. 0.8 × 50 (= 40) or 0.6 × 50 (= 30) or 0.14 × 100 (= 14) A1 for 84 cao
17		$n^2 - n + 1$ oe	M1 for correct deduction from differences, eg. 2nd difference of 2 implies $1n^2$ or sight of $1^2, 2^2, 3^2, ..$ M1 for sight of $1^2, 2^2, 3^2, ..$ linked with 1, 2, 3, ... A1 for $n^2 - n + 1$ oe

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
18		$3x^2 + 10x$	M1 start a chain of reasoning, eg. $3(x+2)^2 - 2(x+2) - 8$ M1 continue chain by expanding brackets correctly, eg. $3x^2 + 12x + 12 - 2x - 4 - 8$ A1 for $3x^2 + 10x$ ($a = 3$, $b = 10$)
19		8.63 to 8.65	P1 for a start of process, eg. $0.5x(x - 2) = 2.5$ P1 for rearranging to give a quadratic equation, eg $x^2 - 2x - 5 = 0$ oe. P1 for a process to solve the quadratic equation, condoning one sign error in use of formula (x = 3.449... and x = –1.449...) P1 for selecting the positive value of x and applying Pythagoras to find the hypotenuse, eg. $\sqrt{(3.449^2 + 1.449^2)}$ (= 3.74...) P1 for complete process to find perimeter A1 for answer in the range 8.63 to 8.65

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
20 a		3 to 4	C1 for a tangent drawn at $t = 6$ B1 for answer in range 3 to 4
b		452	C1 for splitting the area into 3 strips and a method of finding the area of one shape under the graph, eg. $\frac{1}{2} \times 4 \times 35$ (= 70) M1 for complete process to find the area under the graph, eg "70" + $\frac{1}{2} \times 4 \times (35 + 51)$ (= 172) + $\frac{1}{2} \times 4 \times (51 + 54)$ (= 210) [= 452] A1 for 452
21		10169 or 10170	P1 for correct use of formula to find number in 2016, eg. 1.05(9500 – 250) (= 9712.5) P1 for complete iterative process, eg. 2017: 1.05(9712.5 – 250) (= 9935.625) 2018: 1.05(9935.625 – 250) C1 for answer of 10169.90... correctly rounded or truncated to nearest whole number
22		1.5	B1 for any correct bound clearly identified, eg. 99.65 →x → 99.75 or 66.5 → y→ 67.5 M1 for method to find UB, eg. "99.75" ÷ "66.5" A1 for 1.5

Paper 1MA1: 2H			
Question	**Working**	**Answer**	**Notes**
23		$y = -\frac{4}{3}x + \frac{25}{3}$ oe	M1 for method to find gradient of tangent, eg. $-1 \div \frac{3}{4} = -\frac{4}{3}$ M1 for method to find y-intercept using $y = "-\frac{4}{3}"x + c$ A1 $y = -\frac{4}{3}x + \frac{25}{3}$ oe
24		Proof	C1 for joining AO (extended to D) and considering angles in two triangles (algebraic notation may be used here) C1 for using isosceles triangle properties to find angle BOD (eg. $x + x = 2x$) or angle COD (eg. $y + y = 2y$) C1 for angle $BOC = 2x + 2y$ [= 2×angle BAO + 2×angle CAO] C1 for completion of proof with all reasons given, eg. base angles of isosceles triangle are equal and sum of angles at a point is 360^o

Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9 - 1)

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics

Paper 3 (Calculator)

Higher Tier

Specimen Papers Set 1
Time: 1 hour 30 minutes

Paper Reference
1MA1/3H

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

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out**.

Information

- The total mark for this paper is 80
- 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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PEARSON

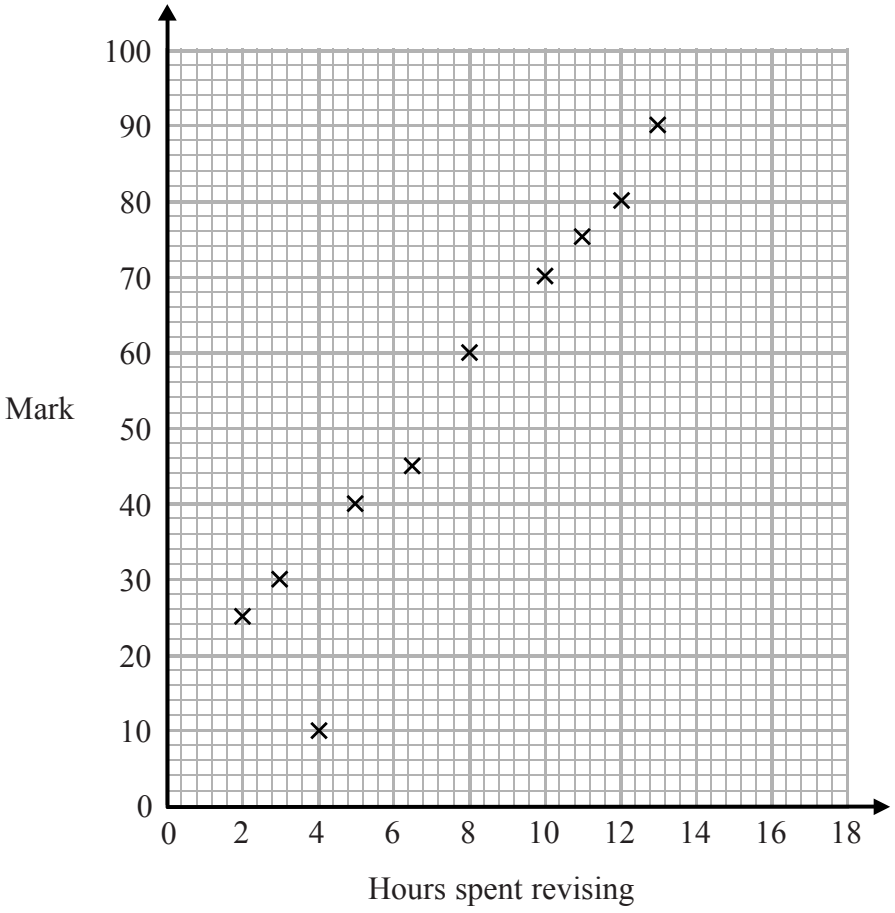
Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The scatter diagram shows information about 10 students.

For each student, it shows the number of hours spent revising and the mark the student achieved in the Spanish test.



One of the points is an outlier.

(a) Write down the coordinates of the outlier.

.....

(1)

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For all the **other** points

(b) (i) draw the line of best fit,

(ii) describe the correlation.

.....

.....

(2)

A different student studies for 9 hours.

(c) Estimate the mark gained by this student.

.....

(1)

The Spanish test was marked out of 100

Lucia says,

"I can see from the graph that had I revised for 18 hours I would have got full marks."

(d) Comment on what Lucia says.

.....

.....

(1)

(Total for Question 1 is 5 marks)

2 The length, L cm, of a line is measured as 13 cm correct to the nearest centimetre.

Complete the following statement to show the range of possible values of L

..... $\leqslant L <$ .....

(Total for Question 2 is 2 marks)

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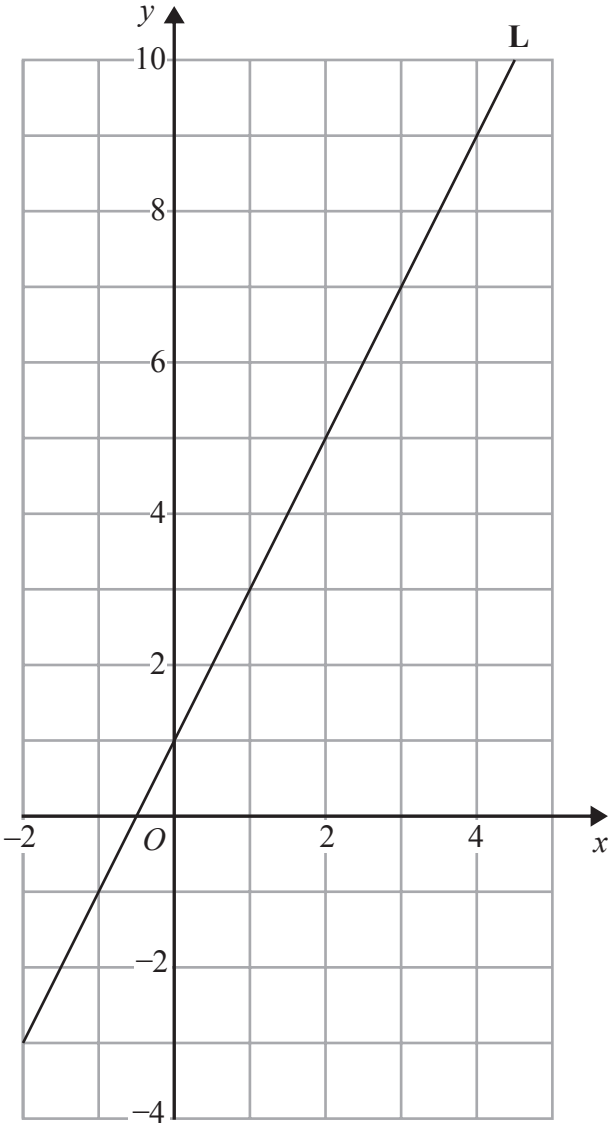
3 Line **L** is drawn on the grid below.



Find the equation for the straight line **L**.
Give your answer in the form $y = mx + c$

(Total for Question 3 is 3 marks)

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4 Jenny works in a shop that sells belts.

The table shows information about the waist sizes of 50 customers who bought belts from the shop in May.

Belt size	Waist (w inches)	Frequency
Small	$28 < w \leqslant 32$	24
Medium	$32 < w \leqslant 36$	12
Large	$36 < w \leqslant 40$	8
Extra Large	$40 < w \leqslant 44$	6

(a) Calculate an estimate for the mean waist size.

.....inches

(3)

Belts are made in sizes Small, Medium, Large and Extra Large.

Jenny needs to order more belts in June.
The modal size of belts sold is Small.

Jenny is going to order $\frac{3}{4}$ of the belts in size Small.

The manager of the shop tells Jenny she should **not** order so many Small belts.

(b) Who is correct, Jenny or the manager?
You must give a reason for your answer.

.....

.....

(2)

(Total for Question 4 is 5 marks)

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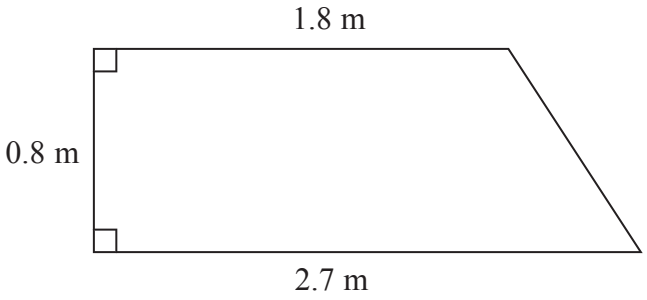
5 The diagram shows a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.
Each tile is rectangular, 15 cm by 7.5 cm

Tiles are sold in packs.
There are 9 tiles in each pack.

Karen divides the area of this wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

(a) Use Karen's method to work out the estimate for the number of packs of tiles she needs to buy.

(5)

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Karen is advised to buy 10% more tiles than she estimated.
Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

(b) Is Karen's assumption correct?
You must show your working.

(2)

(Total for Question 5 is 7 marks)

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6 Factorise $x^2 + 3x - 4$

.....

(Total for Question 6 is 2 marks)

7 Here are the equations of four straight lines.

Line A $y = 2x + 4$
Line B $2y = x + 4$
Line C $2x + 2y = 4$
Line D $2x - y = 4$

Two of these lines are parallel.

Write down the two parallel lines?

Line ..... and line .....

(Total for Question 7 is 1 mark)

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8 Ian invested an amount of money at 3% per annum compound interest.
At the end of 2 years the value of the investment was £2652.25

(a) Work out the amount of money Ian invested.

£.....

(3)

Noah has an amount of money to invest for five years.

Saver Account	Investment Account
4% per annum compound interest.	21% interest paid at the end of 5 years.

Noah wants to get the most interest possible.

(b) Which account is best?
You must show how you got your answer.

(2)

(Total for Question 8 is 5 marks)

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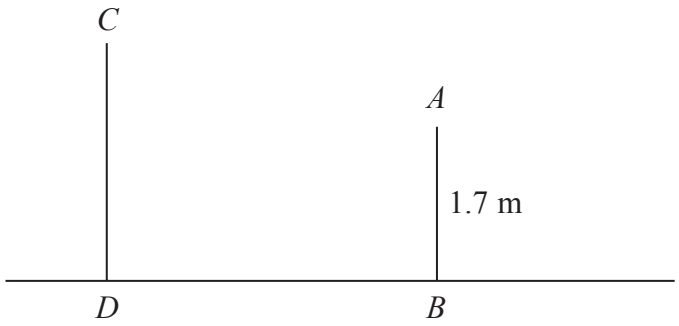
9 The diagram shows two vertical posts, AB and CD, on horizontal ground.



$AB = 1.7$ m
$CD : AB = 1.5 : 1$

The angle of elevation of C from A is 52°

Calculate the length of BD.
Give your answer correct to 3 significant figures.

.....m

(Total of Question 9 is 4 marks)

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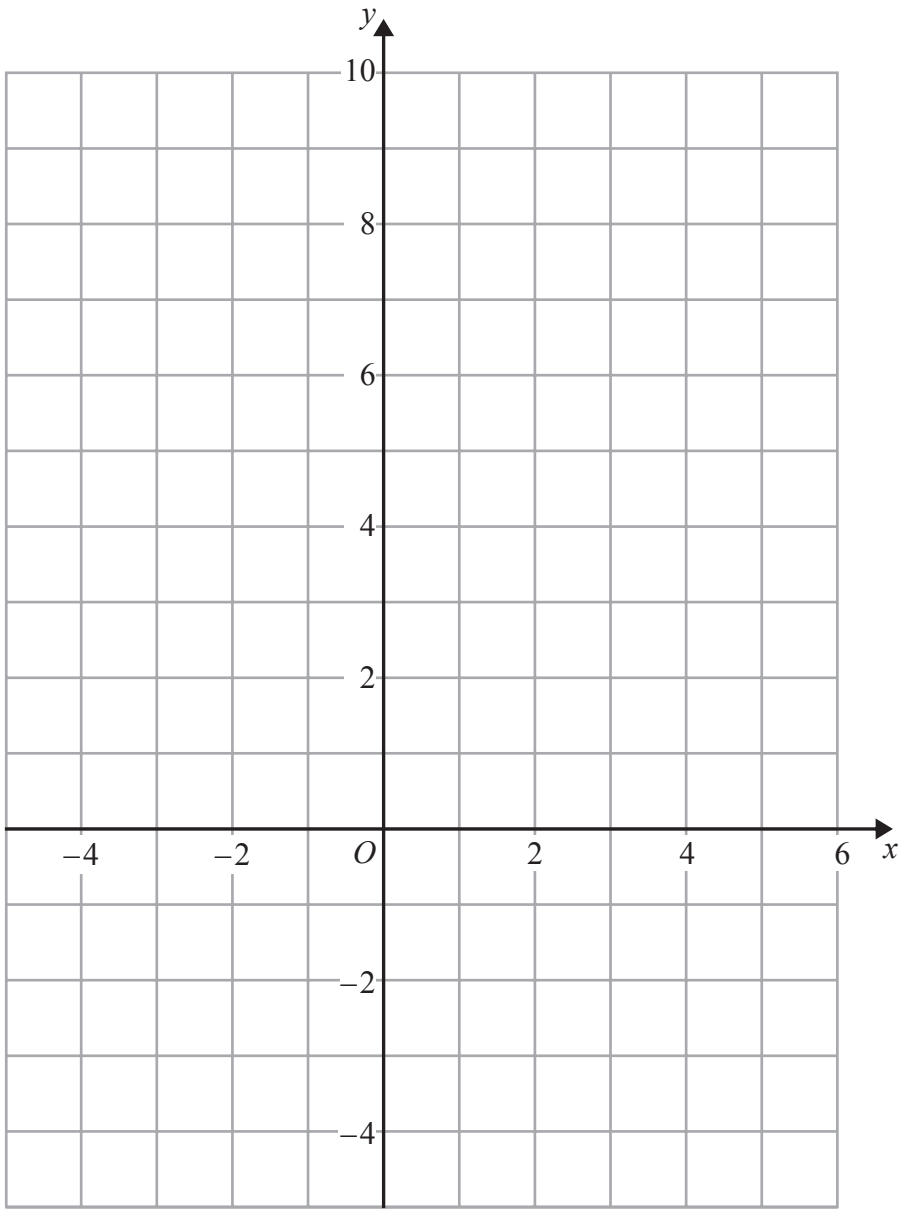
10 On the grid, shade the region that satisfies all these inequalities.

$$x + y < 4 \qquad y > x - 1 \qquad y < 3x$$

Label the region **R**.



(Total for Question 10 is 4 marks)

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11 Write $x^2 + 2x - 8$ in the form $(x + m)^2 + n$ where m and n are integers.

.....

(Total for Question 11 is 2 marks)

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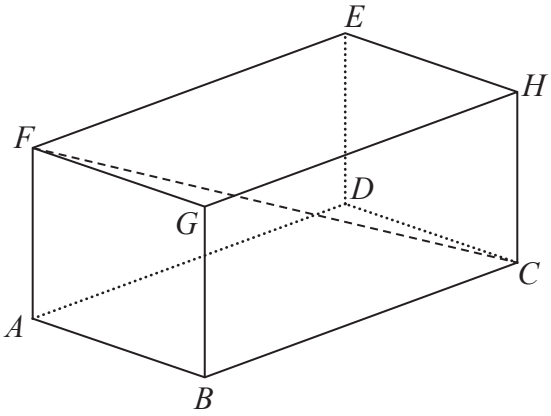
12 The diagram shows a cuboid *ABCDEFGH*.



AB = 7 cm, *AF* = 5 cm and *FC* = 15 cm.

Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 12 is 4 marks)

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13 There are 14 boys and 12 girls in a class.

Work out the total number of ways that 1 boy and 1 girl can be chosen from the class.

(Total for Question 13 is 2 marks)

14 Write

$$4 - \left[(x + 3) \div \frac{x^2 + 5x + 6}{x - 2} \right]$$

as a single fraction in its simplest form.
You must show your working.

(Total for Question 14 is 4 marks)

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15 A virus on a computer is causing errors.
An antivirus program is run to remove these errors.

An estimate for the number of errors at the end of t hours is $10^6 \times 2^{-t}$

(a) Work out an estimate for the number of errors on the computer at the end of 8 hours.

.....

(2)

(b) Explain whether the number of errors on this computer ever reaches zero.

.....

.....

.....

(1)

(Total for Question 15 is 3 marks)

16 The graph of $y = f(x)$ is transformed to give the graph of $y = -f(x + 3)$
The point A on the graph of $y = f(x)$ is mapped to the point P on the graph of $y = -f(x + 3)$

The coordinates of point A are (9, 1)
Find the coordinates of point P.

(..... , ...)

(Total for Question 16 is 2 marks)

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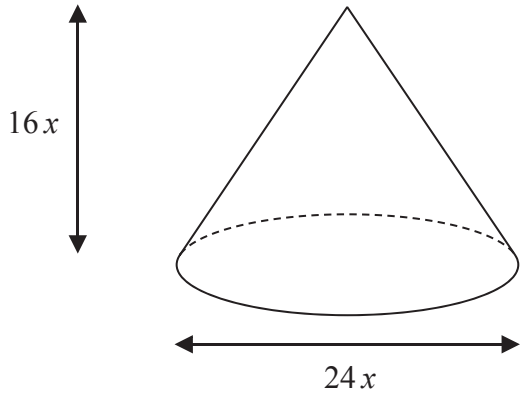
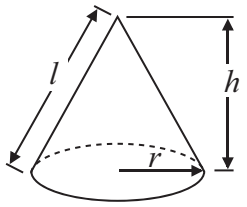
17 The diagram shows a solid cone.



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

Curved surface area of cone = πrl



The diameter of the base of the cone is $24x$ cm.
The height of the cone is $16x$ cm.

The curved surface area of the cone is 2160π cm^2.
The volume of the cone is $V\pi$ cm^3, where V is an integer.

Find the value of V.

(Total for Question 17 is 5 marks)

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18 Thelma spins a biased coin twice.
The probability that it will come down heads both times is 0.09

Calculate the probability that it will come down tails both times.

.....

(Total for Question 18 is 3 marks)

19 (a) Write 0.000 423 in standard form.

.....

(1)

(b) Write 4.5×10^4 as an ordinary number.

.....

(1)

(Total for Question 19 is 2 marks)

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20 Mark has made a clay model.
He will now make a clay statue that is mathematically similar to the clay model.

The model has a base area of 6 cm^2
The statue will have a base area of 253.5 cm^2

Mark used 2 kg of clay to make the model.

Clay is sold in 10 kg bags.
Mark has to buy all the clay he needs to make the statue.

How many bags of clay will Mark need to buy?

.....

(Total for Question 20 is 3 marks)

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21 (a) Show that the equation $3x^2 - x^3 + 3 = 0$ can be rearranged to give

$$x = 3 + \frac{3}{x^2}$$

(2)

(b) Using

$$x_{n+1} = 3 + \frac{3}{x_n^2} \quad \text{with } x_0 = 3.2,$$

find the values of x_1, x_2 and x_3

(3)

(c) Explain what the values of x_1, x_2 and x_3 represent.

(1)

(Total for Question 21 is 6 marks)

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

7 13 19 25 31

Prove that the difference between the squares of any two terms of the sequence is always a multiple of 24

(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

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Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
1(a)		(4,10)	B1 cao
1(b)(i)		Line drawn	B1 Straight line drawn passing between (2,20) and (2,30) AND (13,86) and (13,94)
1(b)(ii)		Positive	C1 positive
1(c)		Value between 60 and70	C1 a correct value given
1(d)		Statement	C1 for referring to the danger of extrapolation outside the given range or for a given point Eg line of best fit may not continue or full marks are hard to achieve no matter how much revision is done
2		$12.5 \leq L < 13.5$	B1 12.5 B1 13.5
3		$y = 2x + 1$	M1 for a method to find the gradient M1 for a method to find the c in $y = mx + c$ A1 $y = 2x + 1$ oe in this format
4(a)	(720+408+304+252)÷50	33.68	M1 for finding 4 products *fw* consistently within interval (including end points) M1 (dep on 1st M) for 'Σ*f*w÷50 A1 cao

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
4(b)		Manager with reasons	M1 for strategy to compare number of small size sold to number ordered C1 clear comparison that small size is not ¾ and so Jenny is not correct or the manager is correct
5(a)	160 tiles 18 packs	18	M1 a full method to find the area of the trapezium M1 a full method to convert all areas to consistent units M1 for the area of the trapezium ÷ area of a tile M1 for communication of the number of whole packs required A1
5(b)	176 tiles 20 packs	Supported statement	P1 finding that 10% extra requires two more packs or 10% of 18 C1Statement eg increase in packs is 2 more which is more than 10%
6		$(x-1)(x+4)$	M1 $(x \pm 1)(x \pm 4)$ A1 $(x-1)(x+4)$ oe
7		A and D	C1 in any order
8(a)		2500	P1 for use of 1.03 P1 for a full method equivalent to $\div 1.03^2$ A1 2500
8(b)		Saver account with support	P1 process to find a comparable total interest figure A1 for conclusion with supporting statement eg 21.(665..)>21
9		0.664(09..)	P1 for finding the difference in height by ratio or multiplier P1 for use of tan ratio P1 (dep) for 0.85÷tan52 A1 awrt 0.664

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
10		Region R	M1 for one line correctly drawn M1 for two or more lines correctly drawn A1 for a correct region indicated between two correct lines A1 fully correct region indicated with all lines correct
11		$(x+1)^2-9$	M1 for $(x+1)^2$ A1 cao
12		431	B1 for use of Pythagoras involving the unknown length P1 for setting up an equation equivalent to $x^2 = 15^2 - 5^2 - 7^2$ P1 for finding the volume using their "$\sqrt{15^2 - 5^2 - 7^2}$ A1awrt 430.5
13		168	M1 product of 14 and 12 A1 cao
14		$\frac{3x+10}{x+2}$	B1 for factorising to get $(x+3)(x+2)$ M1 for dealing with the division of $(x+3)$ by $\frac{x^2+5x+6}{x-2}$ M1 for two correct fractions with a common denominator or a correct single fraction A1 $\frac{3x+10}{x+2}$
15(a) 15(b)		3906 Decision	P1 1000 000 ÷ 256 A1 3906 or 3907 or 3900 or 3906.25 C1 Decision and supporting statement Eg no never zero or yes cannot have a part error Note just yes or no will score zero

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
16		(6, –1)	M1 for a method showing the translation of a graph or a correct coordinate A1 cao
17	$l = 20x$ $x = 3$	20736	P1 for a method to find the slant height of the cone eg $\sqrt{16x^2 + 12x^2}$ or by similar triangles and Pythagorean triples P1 for setting up an equation for the curved surface area in terms of x eg $2160\pi = \pi \times 12x \times 20x$ P1 for complete method to find the value of x P1 for a method to find the volume A1 cao
18		0.49	P1 for $\sqrt{0.09}$ P1 for (1-"$\sqrt{0.09}$")^2 A1 cao
19(a) (b)		4.23×10^{-4} 45000	B1 B1
20		55	P1 for $\sqrt{\frac{253.5}{6}}$ (=6.5) P1 for 2 × "6.5"^{3} ÷ 10 (=54.925) A1 cao

Paper 1MA1: 3H			
Question	**Working**	**Answer**	**Notes**
21(a)		Re arrangement	M1 for re arranging to $x^3 =$ C1 a clear step to show re arrangement
21(b)	$x_1 = 3.29296875$ $x_2 = 3.276659786$ $x_3 = 3.279420685$	3.28	M1 for one correct iteration M1 for 2 further iterations seen A1 cao
21(c)		Statement	C1 Statement eg iteration is an estimation of the solution
22		Proof	B1 state the difference of two squares in algebraic notation eg $p^2 - q^2$ M1 for writing down expressions for the two different numbers eg $6n + 1$ and $6m + 1$ M1 for expanding one bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs A1 for $36(m^2 - n^2) + 12(n - m)$ oe M1 (dep M2) for extracting a factor of 12 from their expression C1 for fully correct working with statement justifying $(n - m)$ $(3(n + m) + 1)$ as a multiple of 2 eg considering odd and even combinations