Please check the examination details below before entering your candidate information

Candidate surname	Other names

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

Centre Number | | | | | |

Candidate Number | | | | |

Monday 12 November 2018

Morning (Time: 1 hour 30 minutes) | Paper Reference **1MA1/3H**

Mathematics

Paper 3 (Calculator)
Higher Tier

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

Total Marks

Instructions

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

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 ▶

P55598A

6/7/7/7/1/

P 5 5 5 9 8 A 0 1 2 0

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write 7357 correct to 3 significant figures.

.....

(1)

(b) Work out $\dfrac{\sqrt{17 + 4^2}}{7.3^2}$

Write down all the figures on your calculator display.

.....

(2)

(Total for Question 1 is 3 marks)

2 Last year Jo paid £245 for her car insurance.
This year she has to pay £883 for her car insurance.

Work out the percentage increase in the cost of her car insurance.

.....%

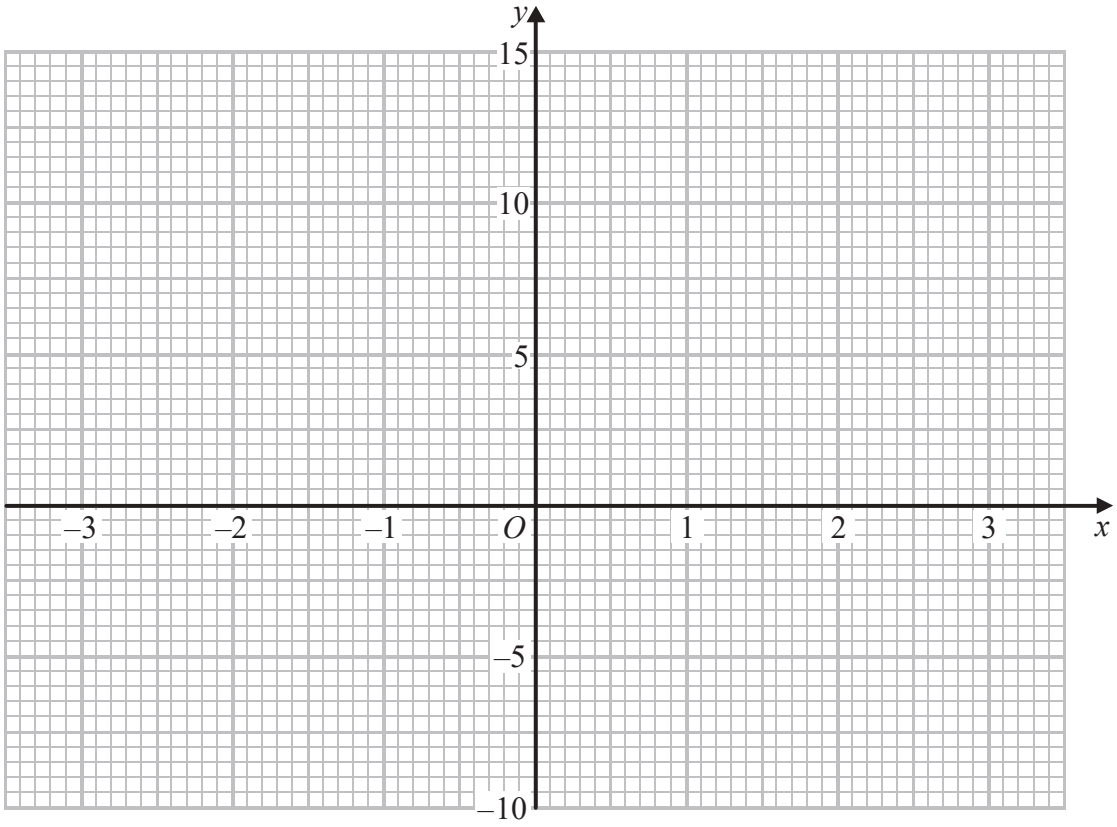
(Total for Question 2 is 3 marks)

3 (a) Complete this table of values for $y = x^2 + x - 4$

x	–3	–2	–1	0	1	2	3
y		–2	–4		–2		

(2)

(b) On the grid, draw the graph of $y = x^2 + x - 4$ for values of x from –3 to 3



(2)

(c) Use the graph to estimate a solution to $x^2 + x - 4 = 0$

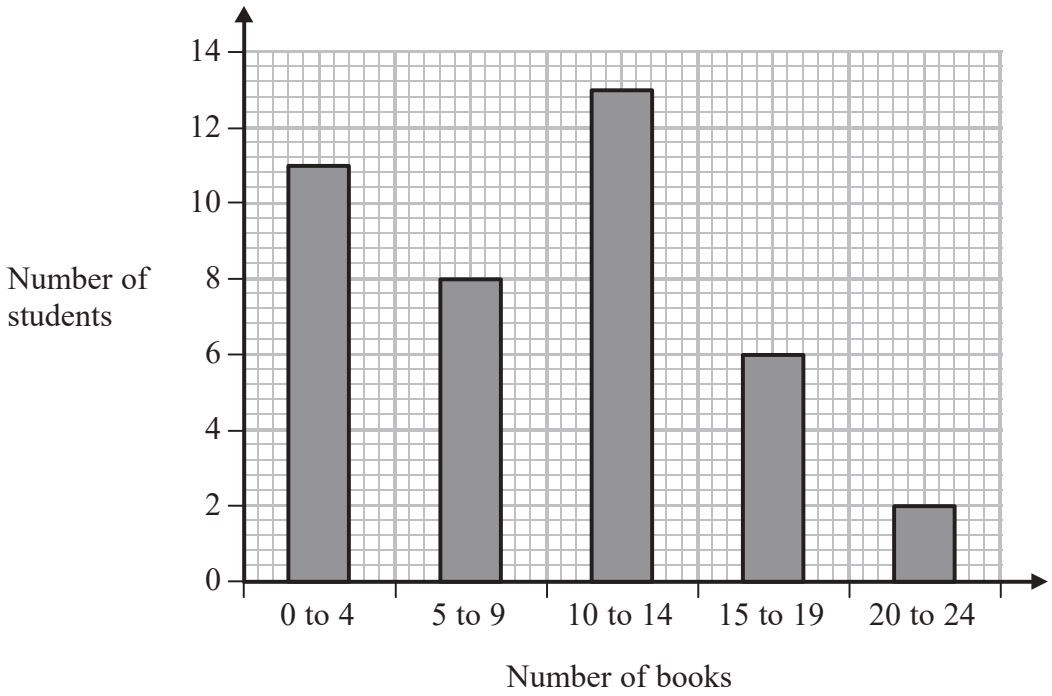
.....

(1)

(Total for Question 3 is 5 marks)

4 Fran asks each of 40 students how many books they bought last year.

The chart below shows information about the number of books bought by each of the 40 students.



(a) Work out the percentage of these students who bought 20 or more books.

.....%

(2)

(b) Show that an estimate for the mean number of books bought is 9.5
You must show all your working.

(4)

(Total for Question 4 is 6 marks)

5 Lara is a skier.

She completed a ski race in 1 minute 54 seconds.
The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

(a) Using this assumption, work out how long Lara should take to complete a 700 m race.
Give your answer in minutes and seconds.

..... minutes ..... seconds

(3)

Lara's average speed actually increases the further she goes.

(b) How does this affect your answer to part (a)?

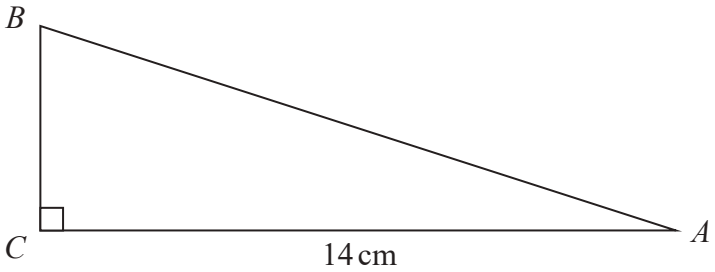
.....

.....

(1)

(Total for Question 5 is 4 marks)

6 ABC is a right-angled triangle.



$AC = 14$ cm.
Angle $C = 90°$

size of angle B : size of angle $A = 3 : 2$

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

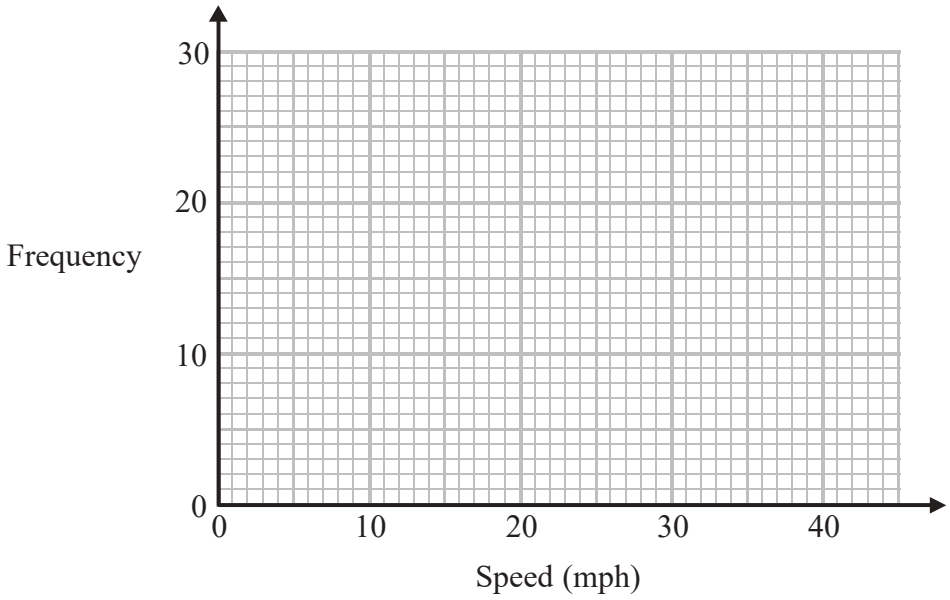
.....cm

(Total for Question 6 is 4 marks)

7 The table gives information about the speeds of 70 cars.

Speed (s mph)	Frequency
$0 < s \leqslant 10$	14
$10 < s \leqslant 20$	18
$20 < s \leqslant 30$	26
$30 < s \leqslant 40$	12

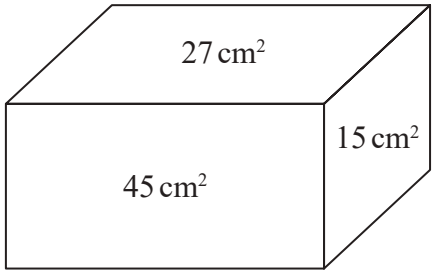
Draw a frequency polygon for this information.



(Total for Question 7 is 2 marks)

8 The diagram shows a solid metal cuboid.

The areas of three of the faces are marked on the diagram.
The lengths, in cm, of the edges of the cuboid are whole numbers.



The metal cuboid is melted and made into cubes.
Each of the cubes has sides of length 2.5 cm.

Work out the greatest number of these cubes that can be made.

.....

(Total for Question 8 is 5 marks)

9 (a) Expand and simplify $(x - 2)(2x + 3)(x + 1)$

.....

(3)

$$\frac{y^4 \times y^n}{y^2} = y^{-3}$$

(b) Find the value of n.

.....

(2)

(c) Solve $5x^2 - 4x - 3 = 0$
Give your solutions correct to 3 significant figures.

.....

(3)

(Total for Question 9 is 8 marks)

10 $f(x) = 4\sin x°$

(a) Find f(23)
Give your answer correct to 3 significant figures.

.....

(1)

$g(x) = 2x - 3$

(b) Find fg(34)
Give your answer correct to 3 significant figures.

.....

(2)

$h(x) = (x + 4)^2$

Ivan needs to solve the following equation $h(x) = 25$

He writes

$(x + 4)^2 = 25$
$x + 4 = 5$
$x = 1$

This is not fully correct.

(c) Explain why.

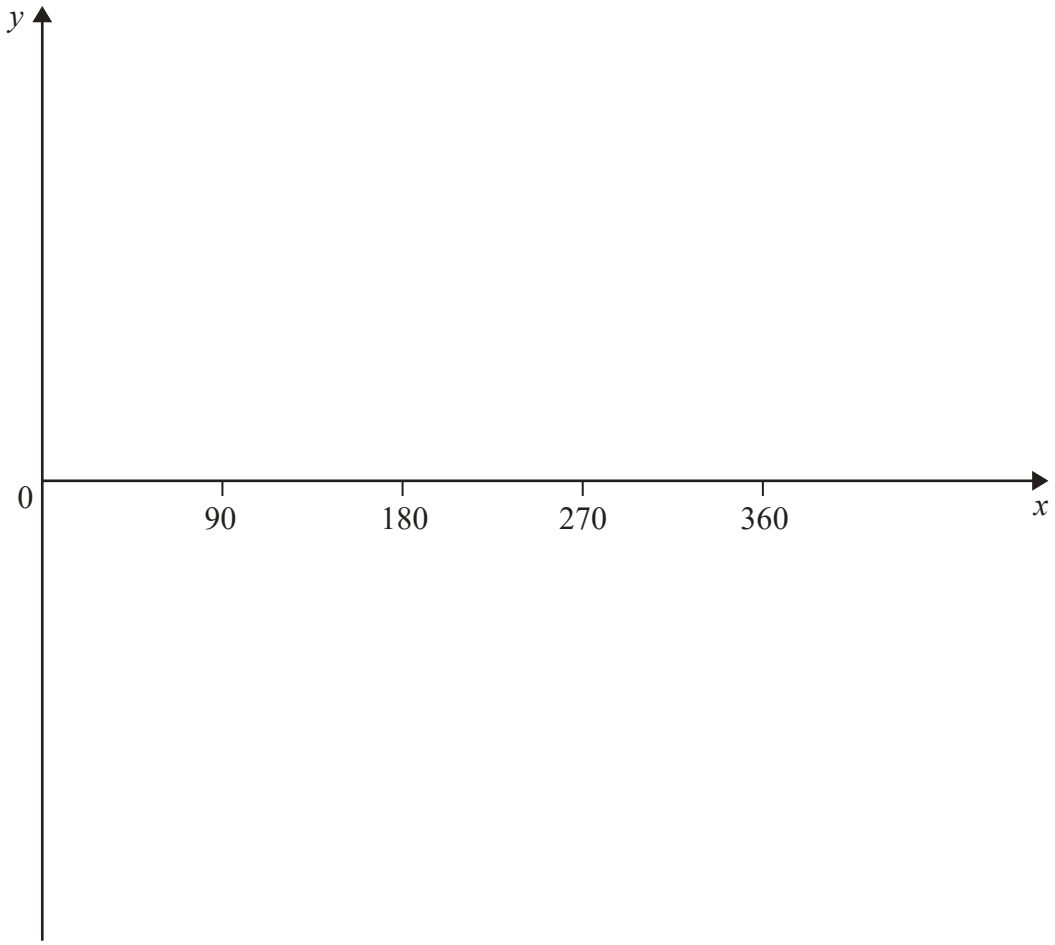
.....

.....

(1)

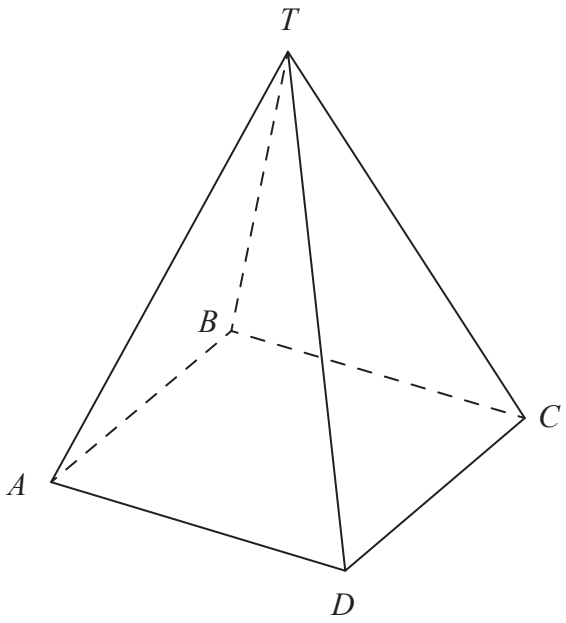
(Total for Question 10 is 4 marks)

11 Sketch the graph of $y = \tan x°$ for $0 \leqslant x \leqslant 360$



(Total for Question 11 is 2 marks)

12 Here is a pyramid with a square base $ABCD$.



$AB = 5\,\text{m}$

The vertex T is 12 m vertically above the midpoint of AC.

Calculate the size of angle TAC.

.....°

(Total for Question 12 is 4 marks)

13 The number of animals in a population at the start of year t is P_t
The number of animals at the start of year 1 is 400

Given that

$$P_{t+1} = 1.01P_t$$

work out the number of animals at the start of year 3

.....

(Total for Question 13 is 2 marks)

14 y is inversely proportional to x^3

$y = 44$ when $x = a$

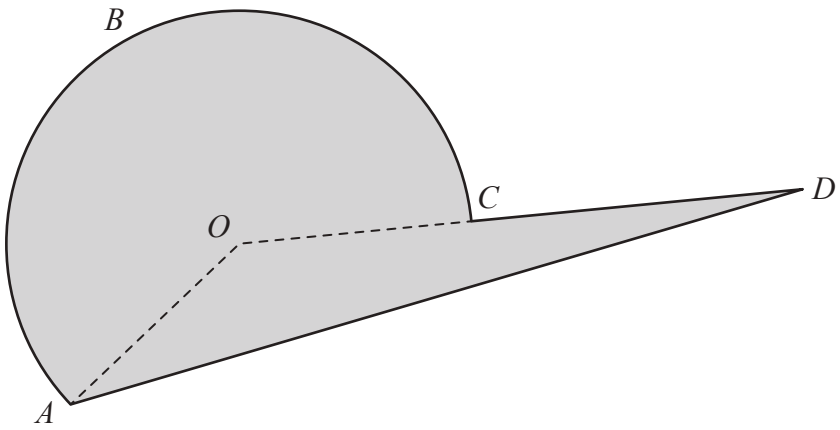
Show that $y = 5.5$ when $x = 2a$

(Total for Question 14 is 3 marks)

15 Prove algebraically that the difference between the squares of any two consecutive odd numbers is always a multiple of 8

(Total for Question 15 is 3 marks)

16 Here is a shaded shape *ABCD*.



The shape is made from a triangle and a sector of a circle, centre *O* and radius 6 cm.
OCD is a straight line.

AD = 14 cm
Angle *AOD* = 140°
Angle *OAD* = 24°

Calculate the perimeter of the shape.
Give your answer correct to 3 significant figures.

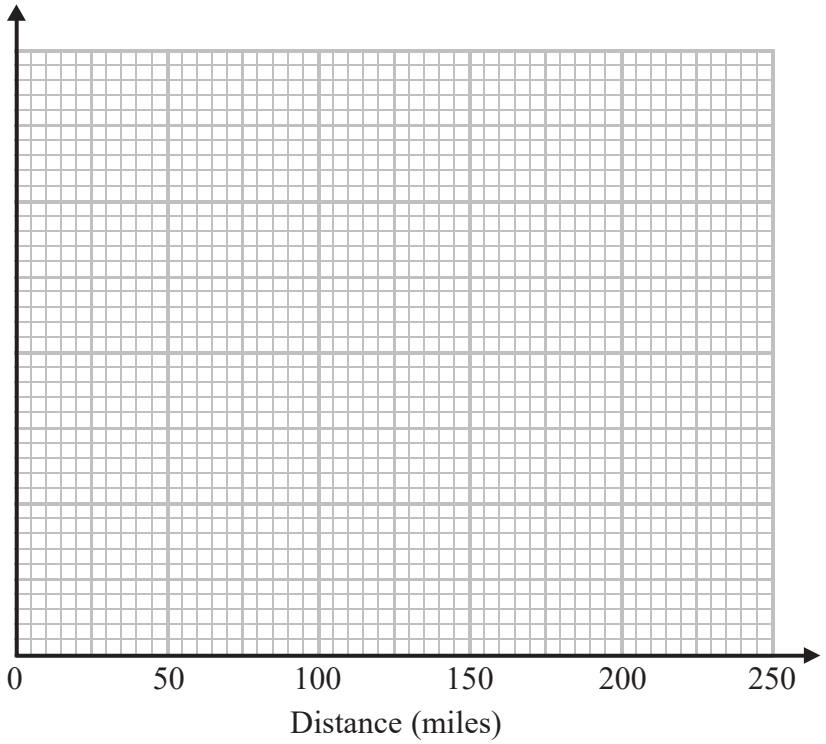
.....cm

(Total for Question 16 is 5 marks)

17 The table shows information about the distances 570 students travelled to a university open day.

Distance (d miles)	Frequency
$0 < d \leqslant 20$	120
$20 < d \leqslant 50$	90
$50 < d \leqslant 80$	120
$80 < d \leqslant 150$	140
$150 < d \leqslant 200$	100

(a) Draw a histogram for the information in the table.



(3)

(b) Estimate the median distance.

..... miles

(2)

(Total for Question 17 is 5 marks)

18 A high speed train travels a distance of 487 km in 3 hours.

The distance is measured correct to the nearest kilometre.
The time is measured correct to the nearest minute.

By considering bounds, work out the average speed, in km/minute, of the train to a suitable degree of accuracy.
You must show all your working and give a reason for your answer.

.....km/minute

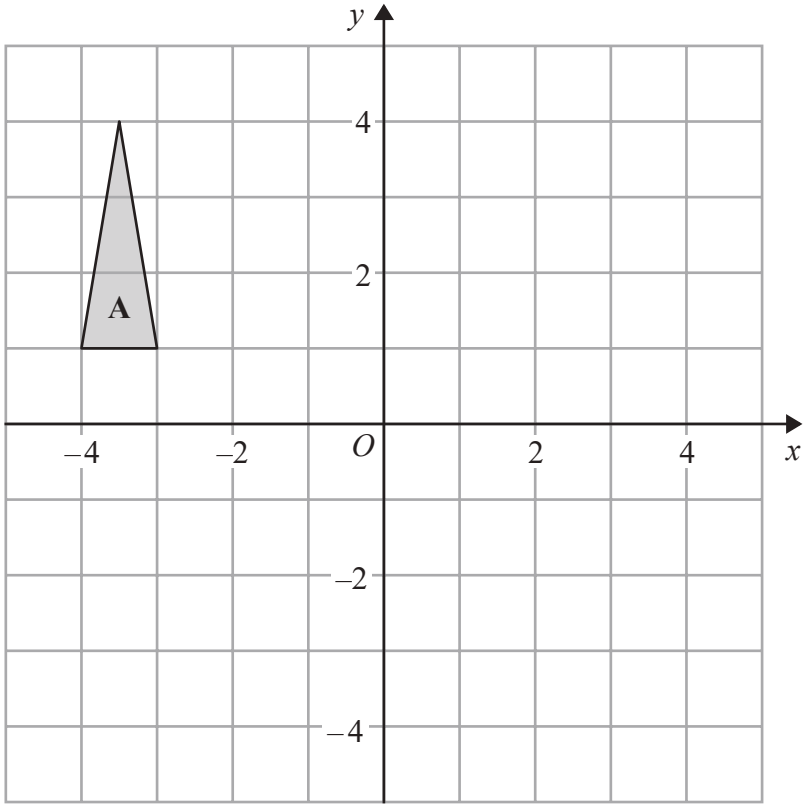
(Total for Question 18 is 5 marks)

19 Solve algebraically the simultaneous equations

$$2x^2 - y^2 = 17$$
$$x + 2y = 1$$

(Total for Question 19 is 5 marks)

20



Triangle **A** is transformed by the combined transformation of a rotation of 180° about the point (−2, 0) followed by a translation with vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

One point on triangle **A** is invariant under the combined transformation.

Find the coordinates of this point.

(..... , ...)

(Total for Question 20 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

Mark Scheme (Results)

November 2018

Pearson Edexcel GCSE (9 – 1)
In Mathematics (1MA1)
Higher (Calculator) Paper 3H

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November 2018
Publications Code 1MA1_3H_1810_MS

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. When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the response should be sent to review.

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 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.

11 Number in brackets after a calculation

Where there is a number in brackets after a calculation E.g. 2 × 6 (=12) then the mark can be awarded **either** for the correct method, implied by the calculation **or** for the correct answer to the calculation.

12 Use of inverted commas

Some numbers in the mark scheme will appear inside inverted commas E.g. "12" × 50 ; the number in inverted commas cannot be any number – it must come from a correct method or process but the candidate may make an arithmetic error in their working.

13 Word in square brackets

Where a word is used in square brackets E.g. [area] × 1.5 : the value used for [area] does **not** have to come from a correct method or process but is the value that the candidate believes is the area. If there are any constraints on the value that can be used, details will be given in the mark scheme.

14 Misread

If a candidate misreads a number from the question. Eg. uses 252 instead of 255; method or process marks may be awarded provided the question has not been simplified. Examiners should send any instance of a suspected misread to review.

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 awarded for a fully correct statement(s) with no contradiction or ambiguity
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

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
1 (a)	7360	B1	cao	
(b)	0.1077981356	B2	for 0.1077(981…)	Answer must be given to at least 4 decimal places rounded or truncated
		(B1	for 5.74(45626…) **or** 53.29 **or** 0.11 **or** 0.107 **or** 0.108)	Accept a clear indication of the decimal point. Check first four decimal places only
2	260 to 260.5	M1	for 883 – 245 (=638) **or** 883 ÷ 245 (=3.60..) **or** 883 ÷ 245 × 100 (=360(.408...)) oe	
		M1	for a complete method to find the percentage increase eg "638" ÷ 245 × 100 (=260(.408..)) **or** 883 ÷ 245 × 100 − 100 (=260(.408..)) oe	
		A1	Accept answers in the range 260 to 260.5	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
3 (a)	2, −4, 2, 8	B2	all 4 values correct	
		(B1	for 2 or 3 correct values)	
(b)	Graph	M1	(dep B1) for at least 5 points plotted correctly ft from part a	
		A1	for a fully correct curve drawn	Accept freehand curves drawn that are not line segments; there must be some attempt to draw the minimum point below $y = -4$
(c)	−2.6 or 1.6	B1	for 1 correct value, ft a non linear graph	Award for −2.6 or 1.6 or both values but do not award the mark if a correct value is given with an incorrect value. Accept 1.56 or −2.56 Note for ft to be applied if the graph may be joined by line segments

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
4 (a)	5	M1	"2" ÷ 40 × 100	"2" comes from their reading of the height of the 20 to 24 column
		A1	cao	
(b)	9.5 shown	M1	for frequencies of 11, 8, 13, 6 and 2 (allow one error) **or** for midpoints 2, 7, 12, 17 and 22	May be seen on chart
		M1	for finding at least 4 products *fx* consistently within interval (including end points)	
		M1	for Σ"*fx*" ÷ ("11" + "8" + "13" + "6" + "2") **or** (11×2 + 8×7 + 13×12 + 6×17 + 2×22) ÷ 40 **or** Σ"*fx*" (=380) **and** 9.5 × ("11" + "8" + "13" + "6" + "2") (=380)	Evidence of two different calculations that should lead to 380 are required for this mark
		C1	for correct figures showing the answer or accurate figures to compare from correct working eg 380 from two calculations	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
5 (a)	2 mins 48 secs	P1	for an appropriate first step eg 700 ÷ 475 (=1.47..) **or** 475 ÷ [time] (= 4.16.. m/s) **or** [time] ÷ 475 (= 0.24 s/m)	[time] what candidate indicates as time of first race Units are not needed and can be ignored if given
		P1	for a complete method to find the required time eg 700 ÷ 475 × [time] (=168) **or** 700 ÷ (475 ÷ [time]) (=168) **or** [time] ÷ 475 ×700 (=168)	Allow calculation in stages and appropriate rounding.
		A1	cao	
(b)	Statement	C1	eg takes less time **Acceptable examples** Quicker time Faster time Reduces my answer to part (a) **Not acceptable examples** It is an underestimate The amount of time could/may increase Laura goes faster	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
6	17.3	P1	for full process to find either angle eg (180 − 90) ÷ (2+3) ×2 (=36) **or** for 36 or 54 seen as an angle	May be seen on diagram Condone correct values if incorrectly placed.
		P1	for a correct equation using trigonometry eg cos [*A*] = 14÷ *AB*	This must be shown as an equation with all four elements (eg cos, [*A*], 14, *AB*) present. [*A*] could be 36 or any angle clearly and unambiguously identified as *A*. This also applies to [*B*] with Sine.
		P1	(dep previous P mark) for rearranging their trigonometry equation to make *AB* the subject eg (*AB* =) "14 ÷ cos 36"	
		A1	for an answer in the range 17.3 to 17.4	If an answer is shown in the range in working and then incorrectly rounded award full marks.

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
7	Diagram drawn	B2 (B1	for correct frequency polygon for points plotted at correct midpoints of intervals **or** joining points at correct heights consistently within intervals including plotting at end values **or** correct frequency polygon with one point incorrect **or** correct frequency polygon with first and last points joined directly)	Plotting at (5,14), (15,18), (25,26), (35,12) Must use line segments for B2 Joining must be with line segments NB ignore any histogram drawn and any part of frequency polygon outside range of first and last points plotted
8	8	P1 P1 P1 P1 A1	process to start the problem eg $xy = 45$ **and** $xz = 15$ **and** $yz = 27$ **or** 5×9 (=45) **and** 3×9 (=27) **and** 3×5 (=15) **or** 3, 5 and 9 stated for $3 \times 5 \times 9$ (=135) **or** 2 of "9" ÷ 2.5 (=3.6) **or** "5" ÷ 2.5 (=2) **or** "3" ÷ 2.5 (=1.2) for 2.5^3 (=15.625) **or** all of "9" ÷ 2.5 (=3.6) **and** "5" ÷ 2.5 (=2) **and** "3" ÷ 2.5 (=1.2) for a complete process to find the number of cubes possible eg [volume] ÷ "15.625" (=8.64) **or** "3.6" × "2" × "1.2" (=8.64) cao	Maybe seen on diagram [Volume] must come from multiplying together what they clearly indicate as the 3 dimensions of the cuboid. The three dimensions cannot be 45, 27 and 15

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
9 (a)	$2x^3 + x^2 - 7x - 6$	M1	for a method to find the product of two linear expressions eg 3 correct terms out of 4 terms or 4 terms ignoring signs	Note that (eg) $-x-6$ in expansion of $(x-2)(2x+3)$ is to be regarded as 3 correct terms.
		M1	for a complete method to obtain all terms, half of which are correct (ft their first product) eg $2x^3 - x^2 - 6x + 2x^2 - x - 6$	First product must be quadratic but need not be simplified or may be simplified incorrectly
		A1	cao	
(b)	-5	M1	for beginning to combine indices eg $4+n$ or y^{-3+2}	
		A1	cao	
(c)	1.27 and −0.472	M1	for substitution into the formula	Condone one sign error in the substitution Accept -4^2 or $(-4)^2$
		M1	for simplifying to the form $\frac{-b\pm\sqrt{N}}{k}$ eg $\frac{4\pm\sqrt{76}}{10}$ **or** 1.27 to 1.28 **or** −0.48 to −0.47	
		A1	for 1.27 to 1.28 **and** −0.48 to −0.47	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
10 (a)	1.56	B1	1.56 to 1.563	
(b)	3.63	M1	for a complete method to find fg(34) eg 4 sin 65(=3.625..) **or** fg(x) eg 4 sin ($2x-3$)	
		A1	for answer in the range 3.6 to 3.63	If an answer in the range is seen in working and then incorrectly rounded award full marks.
(c)	Statement	C1	for statement eg positive and negative square root required. **Acceptable examples** The other answer is −9 The quadratic should have 2 solutions. **Not acceptable examples** He has not expanded the brackets. He needed to (x+4) twice as there is a squared sign. (x+4)² is 16 not 25. Didn't expand the bracket.	
11	Graph drawn	C2	for fully correct sketch between 0° and 360°	
		(C1	for a graph with clear asymptotes at 90° and 270° only **or** the correct graph translated along the x-axis must have a period of 180)	

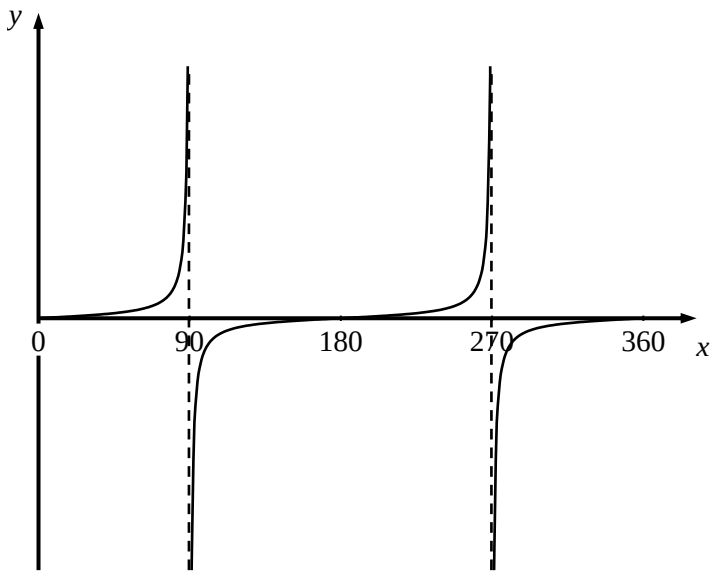
Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
12	73.6	P1 P1 P1 A1	for correct initial use of Pythagoras eg $5^2 + 5^2$ (=50) **or** a trigonometric ratio in the form $\frac{5 \div 2}{0.5AC}$ = sin 45 oe for finding the length of half of the diagonal eg $\sqrt{"50"} \div 2$ (= 3.5...) **or** $0.5AC = \frac{5 \div 2}{\sin 45}$ (=3.5...) oe for process to use tan eg tan *TAC* = (12 ÷ "3.5..") (=3.3..) **or** complete alternative method arriving at an equation with the subject as sin *TAC* or cos *TAC* for an answer in the range 73.58 to 74.1	 do not accept $\sqrt{20} \div 2$
13	408	M1 A1	for 1.01 × 400 (= 404) or 408.04 or 412.08 cao	412(.08) on the answer line M1A0 1.01 × 400 may be seen as part of a calculation
14	Evidence of solution	M1 M1 C1	for constructing an equation eg $y \propto \frac{1}{x^3}$ or eg $y = \frac{k}{x^3}$ oe for substituting in the values *a* and 44 into $y = \frac{k}{x^3}$ for a complete method to use the equation, the value of *k* and $x = 2a$ to show $y = 5.5$ eg $(2a)^3y = 44a^3$ and $y = 44a^3 \div 8a^3 = 5.5$	 Must show all steps clearly

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15	proof	C1	for writing an expression for an odd number, eg $2n + 1$ or $2n – 1$ (assuming n is any integer) **or** states n is even and eg $(n + 1)$ or $(n + 3)$ as odd numbers	
		C1	for a correct expression of the form $(2n + 1)^2 - (2n – 1)^2$ expanded eg $4n^2 + 12n + 9 – (4n^2 + 4n + 1)$ or $4n^2 + 4n + 1 – (4n^2 – 4n + 1)$ **or** $(2n + 1 + 2n – 1)(2n + 1 – (2n – 1))$ **or** when n is even and eg $(n^2 + 6n + 9) – (n^2 + 2n + 1)$ $(=4n + 8)$	Expansion of $(2n – 1)^2 - (2n + 1)^2$ oe is acceptable
		C1	for a correct simplified expression as a multiple of 8 eg $8n + 8$ or $8n$ **or** when n is even **and** eg $4n + 8$ **and** full explanation as to why $4(n+2)$ is always a multiple of 8	
16	39.9	P1	for finding the length of the minor or major arc eg $\frac{220}{360}\pi\times12$ (= 23(.03834..))	Allow appropriate rounding if calculation seen in parts
		P1	for substituting into the sine or cosine rule to find OD eg $14 \div \sin140 = OD \div \sin 24$ **or** $(OD^2=)$ $6^2 +14^2 - 2 \times 6 \times 14 \times \cos 24$ (=78.5....)	Must involve OD in the relationship but may be implied
		P1	for a complete process to find the length OD eg $14 \div \sin140 \times \sin24$ (=8.8(58778..))	
		P1	for a complete process to find the perimeter eg “23(.03834..)” + 14+ “8.8(58778..)” – 6	May be seen in multiple calculations
		A1	for an answer in the range 39.8 to 40	If an answer in the range is seen in working and then incorrectly rounded award full marks.

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
17 (a)	Histogram drawn	B3	for fully correct histogram eg relative heights 6, 3, 4, 2, 2	
		(B2	for 4 correct blocks **or** all 5 frequency ÷ class interval **and** 1 correct block)	
		(B1	for at least 2 correct blocks of different widths **or** for frequency ÷ class interval for at least 3 frequencies)	
(b)	66 to 71	M1	indication of the median in the third interval **or** proportional method shown	Just stating the interval is sufficient for this mark May be implied by the number on the answer line
		A1	ft answer between 66 and 71	Median is at (approx.) 68.75 by a proportional method
18	2.7 with statement	B1	for 179.5 or 180.5 or 180.4999...	
		B1	for 486.5 or 487.5 or 487.4999...	
		P1	for a correct process to find a bound for average speed, eg [upper bound of distance] ÷ [lower bound of time] where $487 < [\text{UB of distance}] \leq 487.5$ and $179.5 \leq [\text{LB of time}] < 180$ **or** for [lower bound of distance] ÷ [upper bound of time] where $486.5 \leq [\text{LB of distance}] < 487$ and $180 < [\text{UB of time}] \leq 180.5$	
		A1	(dep on all previous marks) for 2.695(2…) **and** 2.715(8 …) with both values clearly coming from working with correct values	Accept bounds truncated or rounded to at least 4 sig fig
		C1	for 2.7 from 2.695… and 2.715… **and** statement that both LB and UB round to 2.7	

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
19	$x= -\frac{23}{7}, y = \frac{15}{7}$	M1	for substitution of a rearrangement eg for $2(1 – 2y)^2 – y^2 = 17$ **or** $2x^2 - \left(\frac{1-x}{2}\right)^2 = 17$ **or** expansion of $(1 – 2y)^2 = 1 – 4y + 4y^2$ **or** $\left(\frac{1-x}{2}\right)^2 = \frac{1-2x+x^2}{4}$	
	$x = 3, y = -1$	M1	for expansion of bracket **and** substitution eg $2(1 – 4y + 4y^2) – y^2 (= 17)$ **or** $8x^2 – (1 – 2x + x^2) (= 68)$	
		A1	for forming quadratic ready for solving eg $7y^2 – 8y – 15 (= 0)$ **or** $7x^2 + 2x – 69 (= 0)$	
		M1	ft a 3 term quadratic, factorising eg $(7y – 15)(y + 1) (= 0)$ **or** $(7x + 23)(x – 3) (= 0)$ **or** correct use of formula eg $\frac{8 \pm \sqrt{64+420}}{14}$ or $\frac{-2 \pm \sqrt{4+1932}}{14}$ **or** completing the square	Can be implied by both x values correct or both y values correct.
		A1	$x = -\frac{23}{7}$ oe, $y = \frac{15}{7}$ oe **and** $x = 3, y = -1$	Answers must be correctly paired. (Maybe in the body of the working) Accept for x between -3.29 and -3.28 and for y between 2.14 and 2.15 Answers only award 0 marks
20	$(-3.5, 1)$	M1	for a complete method to show the transformations	Image at $(-4,1)$, $(-3,1)$ and $(-3.5, -2)$
		A1	cao	

Qu 11



Modifications to the mark scheme for Modified Large Print (MLP) papers. Paper 3H.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

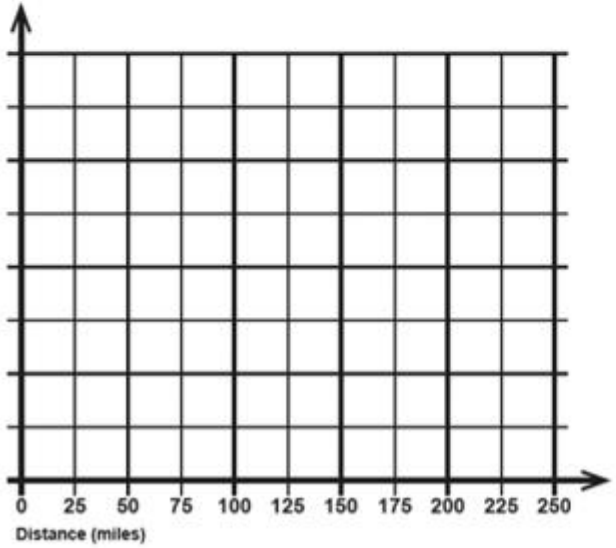
PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
3		Wording added 'There are four spaces to fill.' Table turned to vertical format. Grid enlarged. Y axis changed to go up in units of 2 from -10 to10.	Standard mark scheme
4		Diagram enlarged. Right axis labelled. Shading changed to dotty shading. Axes labels moved to the left of the horizontal axis and above the vertical axis.	Standard mark scheme
6		Diagram enlarged.	Standard mark scheme
7		Diagram enlarged. Right axis labelled. Axes labels moved to the left of the horizontal axis and above the vertical axis. Frequency table changed to: 5, 20, 25, 10 and Frequency column widened. Question wording changed from 70 cars to 60 cars.	Standard mark scheme but plotting at (5,5), (15,20), (25,25), (35,10)
8		Diagram enlarged and model provided for all candidates. Wording added 'and on the model: 15 cm^2, 27cm^2, 45 $cm^{2'}$	Standard mark scheme

PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
9	(a)	MLP only – x changed to y.	Standard mark scheme with x changed to y.
9	(b)	Wording added, 'when'.	Standard mark scheme
11		Diagram enlarged.	Standard mark scheme
12		Diagram enlarged and model provided for all candidates. A dot added at the centre of square *ABCD*, labelled *M*. A line added joining *A* to *M* and another line added joining *M* to *T*. An angle arc added at *A*. Question wording changed to 'The vertex *T* is 12 metres vertically above the midpoint *M* of *AC*.'	Standard mark scheme
16		Diagram enlarged. Shading changed to dotty shading. *AD* labelled 14 cm. Question wording changed to 'The shape is made from the triangle *AOD* and a sector of a circle, centre *O* and radius 6 cm.'	Standard mark scheme
17		Diagram enlarged. x axis marked in units of 25 (as shown). Table changed as shown below. Number of students changed from 570 to 575	Standard mark scheme but histogram drawn at 7.5, 3.75, 5, 2.5, 2.5 Allow some tolerance on heights within gaps if intention is clear. Median at (approx.) 65.75 so allow within range 60 to 70.

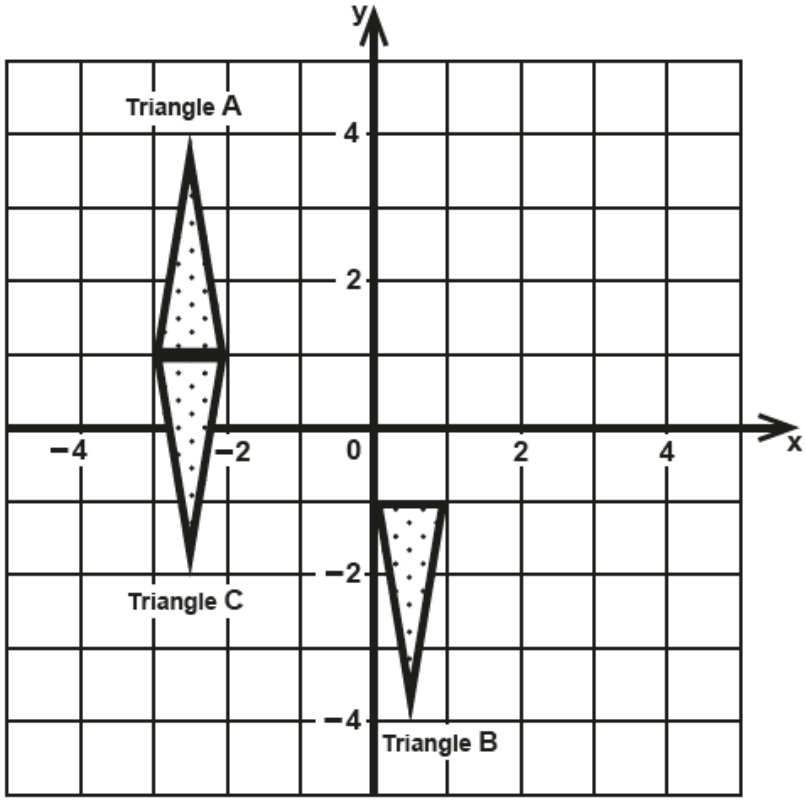
PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
17			

Distance (d miles)	Frequency
$0 < d \leqslant 25$	150
$25 < d \leqslant 50$	75
$50 < d \leqslant 75$	100
$75 < d \leqslant 150$	150
$150 < d \leqslant 200$	100

Widen the frequency column to allow for working.



PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
20		Diagram enlarged and grid changed as shown below. Wording added, 'It shows triangle A, triangle B and triangle C on a grid. A cut out triangle is available if you wish to use it.' A cut out shape provided for all versions. Question wording changed as follows: (a) Describe the TWO transformations that map triangle A onto triangle B, then triangle B onto Triangle C. (1 mark). Three answer lines added for part (a). One point on triangle A is invariant under the combined transformation from triangle A to triangle C. (b) Find the coordinates of this point. (1 mark)	Part (a): award 1 mark for a full description of both transformations: A to B: a rotation of 180° about $(-1,0)$ B to C: a translation of $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$ Do **not** award the mark if there is any ambiguity or any reference to other forms of transformation. Part (b): award 1 mark for $(-2.5, 1)$

PAPER: 1MA1_3H			
Question		**Modification**	**Mark scheme notes**
20			

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