OCR
Oxford Cambridge and RSA

H

GCSE (9–1) Mathematics

J560/04 Paper 4 (Higher Tier)

Thursday 25 May 2017 – Morning

Time allowed: 1 hour 30 minutes

You may use:
- A scientific or graphical calculator
- Geometrical instruments
- Tracing paper

First name									
Last name									
Centre number						Candidate number				

INSTRUCTIONS
- Use black ink. You may use an HB pencil for graphs and diagrams.
- Complete the boxes above with your name, centre number and candidate number.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the barcodes.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- This document consists of **20** pages.

Answer **all** the questions.

1 Calculate.

(a) $\sqrt{\dfrac{4.8^2 + 3.6^2}{4}}$

(a) ..... **[2]**

(b) $\dfrac{1}{(2 \times 10^4) + (5 \times 10^3)}$

(b) ..... **[2]**

2 The length, L, of a steel rod is 8.3 m, correct to 1 decimal place.

Complete the error interval for length L.

..... $\leqslant L <$ .....**[2]**

3 **(a)** Write 504 as the product of its prime factors.

(a) ..... **[3]**

(b) Find the lowest common multiple (LCM) of 180 and 504.

(b) ..... **[2]**

4 Find the value of s when $u = 12$, $a = 10$ and $t = 4$.

$$s = ut + \frac{1}{2}at^2$$

..... **[2]**

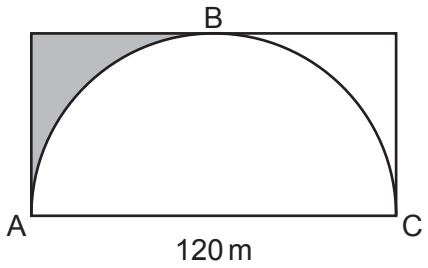
5 Mo's tyre pressure gauge shows a reading which is 12% higher than the actual pressure.

What is the actual pressure when Mo's gauge shows 38.64?

..... **[3]**

6 The diagram shows a semi-circle inside a rectangle of length 120 m.
The semi-circle touches the rectangle at A, B and C.

Not to scale

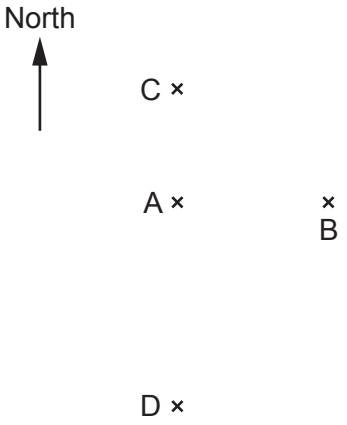


Calculate the **perimeter** of the shaded region.
Give your answer correct to 3 significant figures.

..... m **[5]**

7 A, B, C and D are four towns.

B is 25 kilometres due East of A.
C is 25 kilometres due North of A.
D is 45 kilometres due South of A.



Not to scale

(a) Work out the bearing of B from C.

(a) ..... ° **[2]**

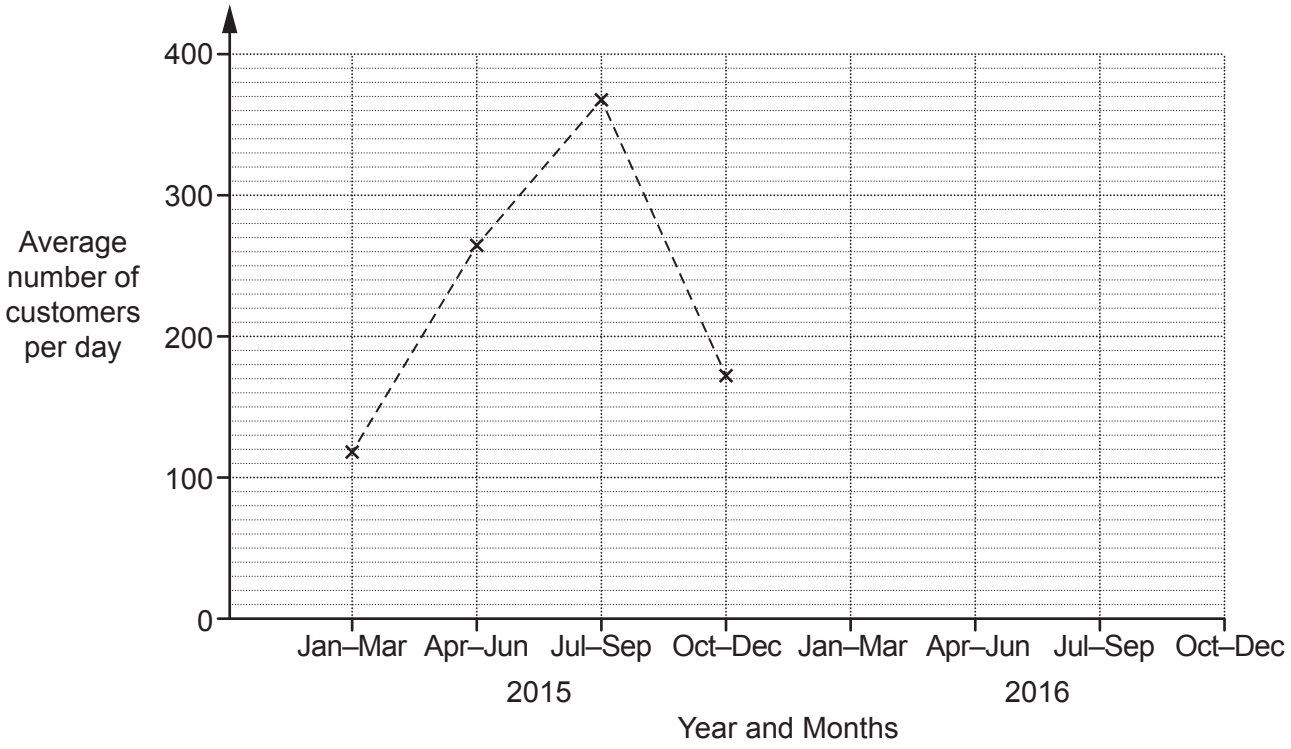
(b) Calculate the bearing of D from B.

(b) ..... ° **[4]**

8 The table shows the average number of customers per day entering a shop.

	2015				2016			
Months	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec	Jan-Mar	Apr-Jun	July-Sep	Oct-Dec
Average number of customers per day	119	264	368	172	130	304	381	192

(a) Complete the time series graph below.



[2]

(b) Make two different comments comparing the number of customers entering the shop in 2015 and 2016.

Comment 1 .....

.....

.....

Comment 2 .....

.....

.....

[2]

9 Each week Dan drives two routes, route X and route Y.

One week he drives route X three times and route Y twice.
He drives a total of 134 miles that week.

Another week he drives route X twice and route Y five times.
He drives a total of 203 miles that week.

(a) Find the length of each route.

(a) route X = ... miles

route Y = ... miles **[5]**

(b) State an assumption that has been made in answering part **(a)**.

.....

..... **[1]**

10 On 1st November 2015 there were 4200 trees planted in a wood.
On 1st November 2016, only 3948 of these trees were still alive.

It is assumed that the number of trees still alive is given by

$$N = ar^t$$

where N is the number of trees still alive t years after 1st November 2015.

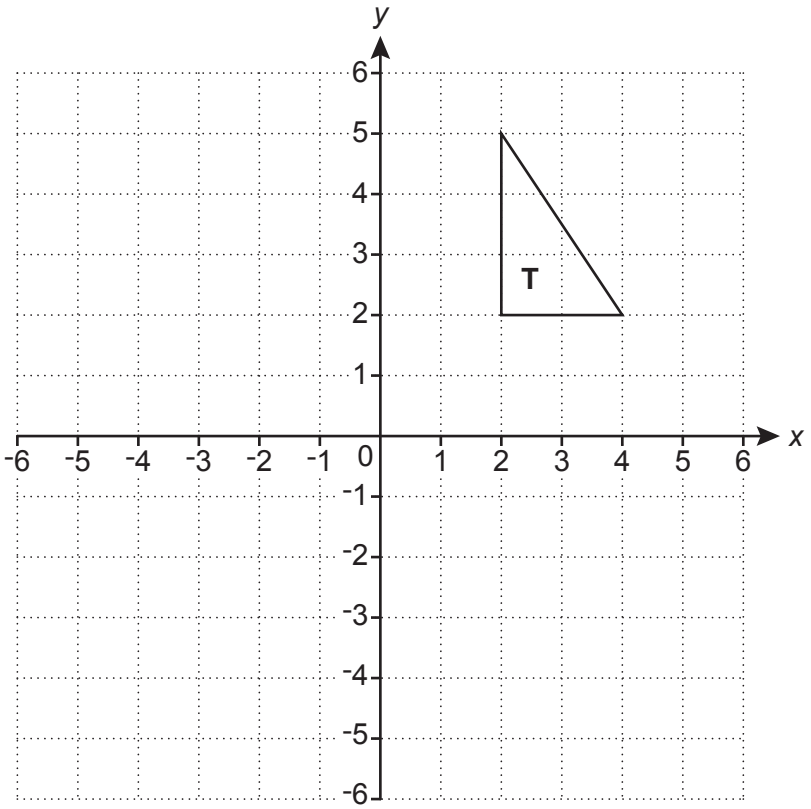
(a) Write down the value of a.

(a) ..... **[1]**

(b) Show that r is 0.94. **[2]**

(c) Show that on 1st November 2030 the number of trees still alive is predicted to have decreased by over 60% compared with 1st November 2015. **[3]**

11 Triangle **T** is drawn on a coordinate grid.



(a) Translate triangle **T** using the vector $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$. **[2]**

(b) Describe fully the **single** transformation that represents the following.

(i) A rotation with centre (0, 0) of 180° followed by a rotation with centre (0, 0) of 90° clockwise.

.....

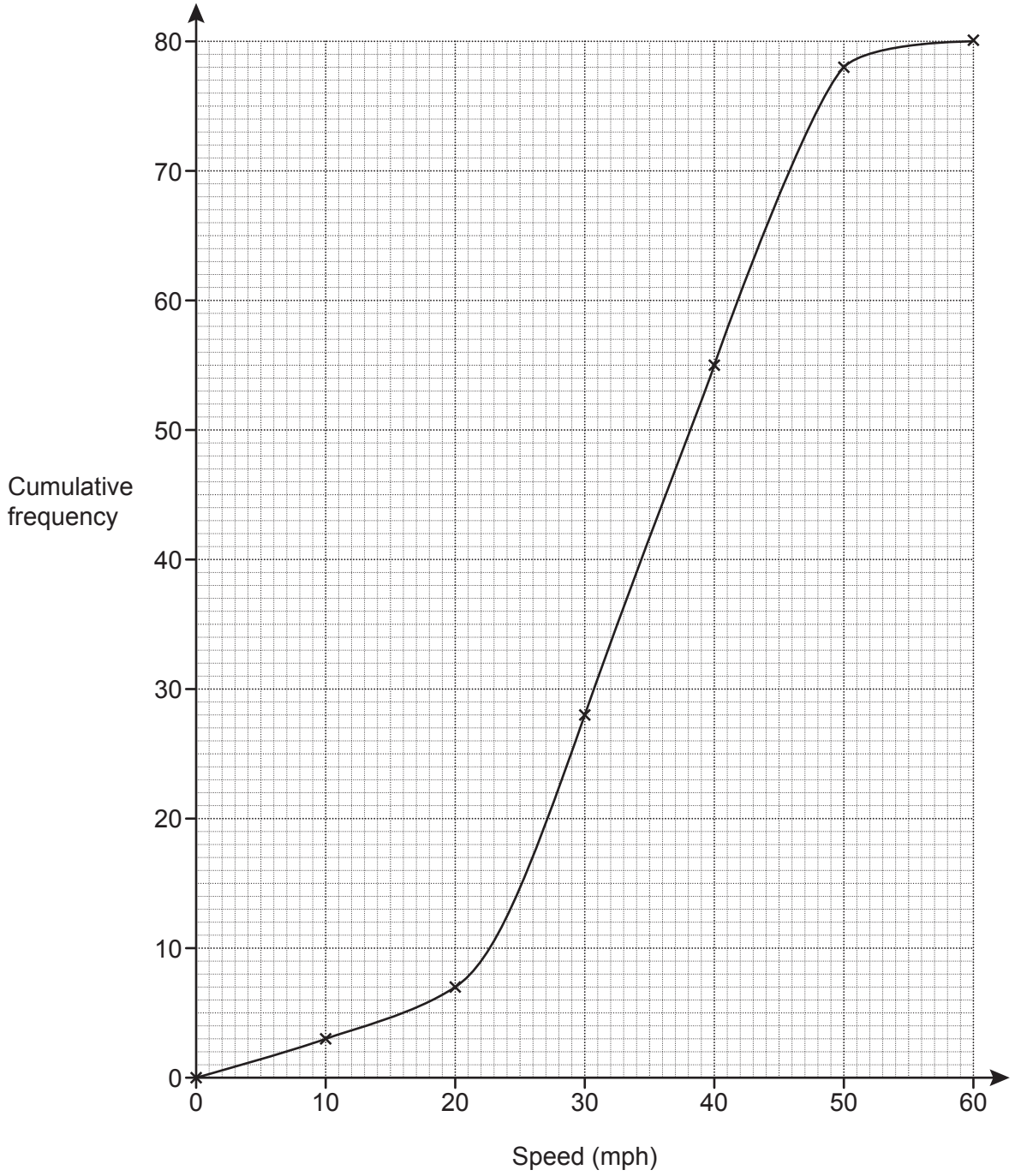
..... **[2]**

(ii) A reflection in the *x*-axis followed by a reflection in the *y*-axis.

.....

..... **[3]**

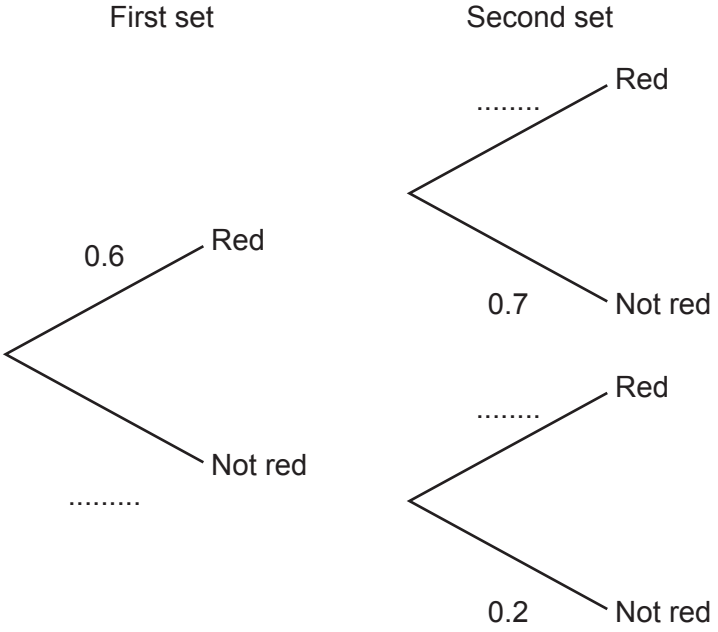
12 The cumulative frequency graph shows the speeds, in miles per hour (mph), of vehicles passing a 40 mph speed limit sign on a road.



A speed camera will be installed if more than 30% of vehicles go over the speed limit of 40 mph.

Use information from the graph to decide if a speed camera should be installed. **[4]**

13 Rashid drives his car along a road passing through two sets of traffic lights.
The tree diagram shows the probabilities of the lights being **red** when he reaches them.



(a) Complete the tree diagram. **[1]**

(b) Write down the probability that the first set is **not red**.

(b) ..... **[1]**

(c) Given that the first set is **red,** write down the probability that the second set is **not red**.

(c) ..... **[1]**

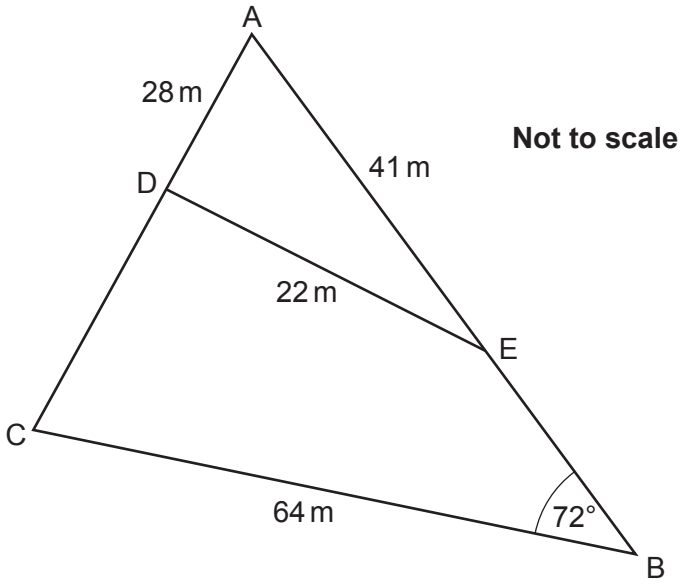
(d) Work out the probability that both sets are **not red**.

(d) ..... **[2]**

(e) Work out the probability that at least one set is **not red**.

(e) ..... **[3]**

14 The diagram shows triangle ABC with D on AC and E on AB.
DE is a straight line.

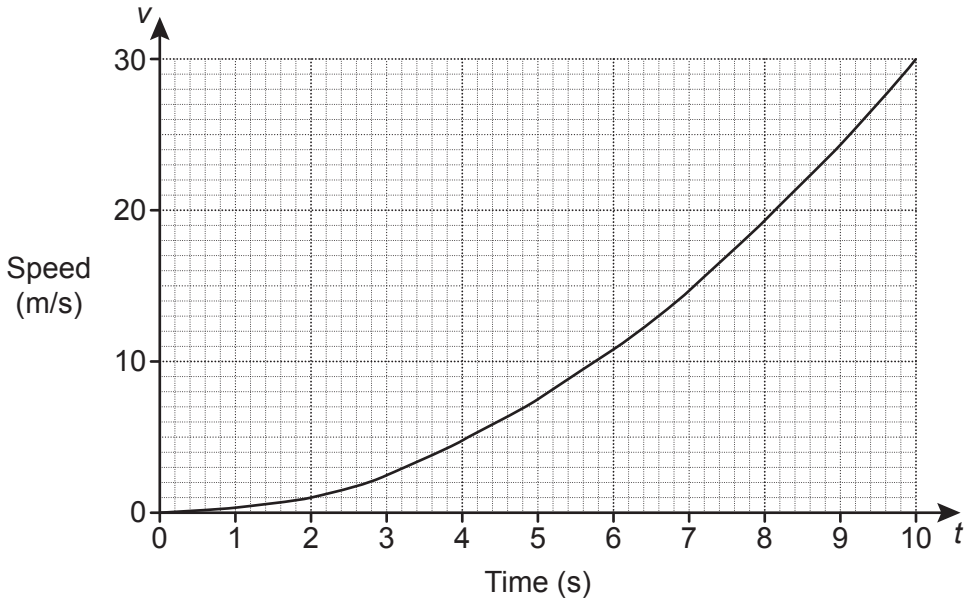


AD = 28 m, AE = 41 m, DE = 22 m and BC = 64 m.

Calculate the length CD.

..... m **[6]**

15 The graph shows the speed, v metres per second (m/s), of a car at time t seconds.



(a) Find the speed of the car at $t = 7$.

(a) ..... m/s **[1]**

(b) It is claimed that the car has accelerated from 0 to 60 miles per hour in the first 10 seconds.

Does the graph support this claim? Show your reasoning.
Use 1 mile = 1.6 kilometres. **[5]**

(c) Use the graph to estimate the acceleration at $t = 7$.

(c) ..... m/s^2 **[3]**

(d) The speed of this car is directly proportional to the square of the time.

Find a formula linking v and t.

(d) ..... **[3]**

(e) Georgina says that the graph shows that the speed of the car will continue to increase after 10 seconds.

Make one comment to show that this statement is incorrect.

.....

.....

..... **[1]**

16 Write $x^2 - 10x + 16$ in the form $(x + a)^2 + b$.

..... **[3]**

17 Describe fully the graph which has the equation $x^2 + y^2 = 9$.

..... **[2]**

18 **(a)** Solve by factorisation.

$$2x^2 + 5x - 12 = 0$$

(a) $x =$ ..... or $x =$ ..... **[3]**

(b) Solve this equation.
Give each value correct to 2 decimal places.

$$3x^2 + 2x - 3 = 0$$

(b) $x =$ ..... or $x =$ ..... **[3]**

19 **(a)** Here are the first four terms of a sequence.

$$\frac{1}{2} \qquad \frac{4}{3} \qquad \frac{9}{4} \qquad \frac{16}{5}$$

Find the nth term of this sequence.

(a) ..... **[2]**

(b) Here are the first four terms of a quadratic sequence, the nth term of this quadratic sequence is $an^2 + bn + c$.

2 12 28 50

Find the values of a, b and c.

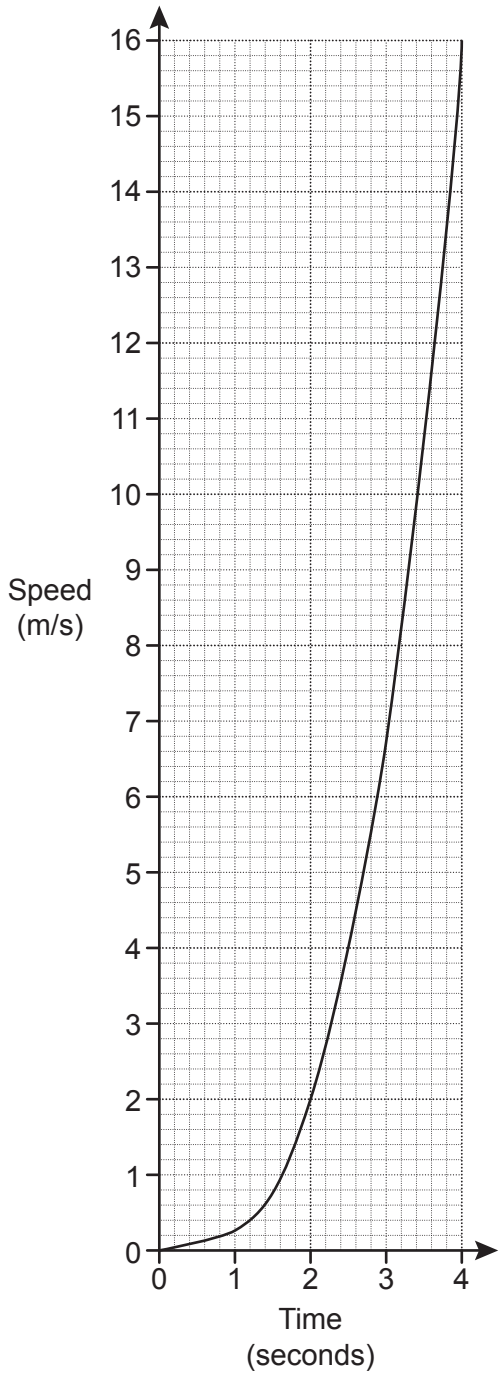
(b) $a =$ .....

$b =$ .....

$c =$ .....

[4]

20 The graph shows the speed, in metres per second, of a particle over the first four seconds of motion.



Use the graph to estimate the distance travelled by the particle in the four seconds.

..... metres **[2]**

END OF QUESTION PAPER

PLEASE DO NOT WRITE ON THIS PAGE

OCR
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GCSE

Mathematics (9-1)

Unit **J560/04:** Paper 4 (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2017

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations used in the detailed Mark Scheme.

Annotation	Meaning
✓	Correct
×	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
^	Omission sign

Subject-Specific Marking Instructions

1. **M** marks are for using a correct method and are not lost for purely numerical errors.
   A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
   B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
   SC marks are for special cases that are worthy of some credit.

2. Unless the answer and marks columns of the mark scheme specify **M** and **A** marks etc, or the mark scheme is 'banded', then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, ie incorrect working is seen and the correct answer clearly follows from it.

3. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, eg FT 180 × (*their* '37' + 16), or FT 300 – √(*their* '$5^2 + 7^{2}$'). Answers to part questions which are being followed through are indicated by eg FT 3 × *their* (a).

For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

4. Where dependent (**dep**) marks are indicated in the mark scheme, you must check that the candidate has met all the criteria specified for the mark to be awarded.

5. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

   - **cao** means **correct answer only**.
   - **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point eg
   - 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
   - **isw** means **ignore subsequent working** (after correct answer obtained).
   - **nfww** means **not from wrong working**.
   - **oe** means **or equivalent**.
   - **rot** means **rounded or truncated**.
   - **seen** means that you should award the mark if that number/expression is seen anywhere in the answer space, including the answer line, even if it is not in the method leading to the final answer.
   - **soi** means **seen or implied**.

6. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise, indicated for example by the instruction 'mark final answer'.

7. As a general principle, if two or more methods are offered, mark only the method that leads to the answer on the answer line. If two (or more) answers are offered, mark the poorer (poorest).

8. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the MR annotation. **M** marks are not deducted for misreads.

9. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

10. If the correct answer is seen in the body and the answer given in the answer space is a clear transcription error allow full marks unless the mark scheme says 'mark final answer' or 'cao'. Place the annotation ✓ next to the correct answer.

If the answer space is blank but the correct answer is seen in the body allow full marks. Place the annotation ✓ next to the correct answer.

If the correct answer is seen in the working but a completely different answer is seen in the answer space, then accuracy marks for the answer are lost. Method marks would still be awarded. Use the M0, M1, M2 annotations as appropriate and place the annotation × next to the wrong answer.

11. Ranges of answers given in the mark scheme are always inclusive.

12. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

13. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

Question			Answer	Marks	Part marks and guidance	
1	(a)		3	2	**B1** for 36 or 9	ignore ±
	(b)		4×10^{-5} or [0]. 000 04	2	**B1** for 2.5×10^{4} or 25 000	Condone $\frac{1}{25\,000}$ for 2 marks
2			8.25 8.35	2	**B1** for either one correct or for both correct but reversed	
3	(a)		2×2×2×3×3×7 or $2^3 \times 3^2 \times 7$ final answer	3	**B2** for 2,2,2,3,3,7 or 2^3, 3^2, 7 or for a correct expression one stage short of the correct answer e.g. $2^3 \times 9 \times 7$ or **B1** for two of 2,3,7 identified	allow "." for "×" and condone 2^3 3^2 7 for **3** marks for **B1** and **B2** allow factor tables and trees
	(b)		2520	2	**M1** for factors of 180 = 2,2,3,3,5 oe or seen as factor tables and trees If **0** scored then **SC1** for 2520*n* e.g. 90 720	accept any correct method
4			128	2	**M1** for $12(4) + \frac{1}{2}(10)(4)^2$ or **B1** for 48 or 80	
5			34.5	3	**M2** for 38.64 ÷ 1.12 oe or **B1** for 1.12 or 112	

Question			Answer	Marks	Part marks and guidance	
6			214	5	**B4** for 214.2 or 214.24 to 214.26 OR **B1** for 60 marked or used as width of the rectangle or distance from B to the corner AND **M2** for ¼ × π × 120 soi by 30π, 94.2 or 94.24 to 94.26 or **M1** for π × 120 soi by 376.8 to 377.1 or ½π × 120 soi by 188.4 to 188.56 AND **M1** for 2 × *their* 60 + *their*30π AND **B1** for their final answer written to more than 3 figs correctly rounded to 3 s.f. <u>to a max. of **4** marks</u>	Accept 120 + 30π for **B4** Allow eg r = 60 for **B1**

Question			Answer	Marks	Part marks and guidance	
7	(a)		135	2	**B1** for angle 45	e.g. 45 marked at ACB or ABC, 180 – 45, 90 + 45
	(b)		209 to 209.1	4	**M2** for $\tan^{-1}$ (45÷25) or $\tan^{-1}$ (25÷45) soi by 61, 60.94 to 60.95 or 29[.1] , 29.05... or **M1** for tan [=] 45÷25 or tan [=] 25÷45 AND **M1** for 270 – *their angle*ABD or 180 + *their angleADB*	Accept longer methods but they must get to the equivalent point to gain credit e.g. if they find the hypotenuse, they score **M0** until they start to use sin or cos. Can be implied by *their* answer
8	(a)		4 points accurately plotted	2	**B1** for 2 or 3 points accurately plotted	condone missing or incorrect lines

Question			Answer	Marks	Part marks and guidance	
	(b)		Here are 4 different categories , • Compares the number of people in the whole of 2015 to the whole of 2016 (e.g. there were more people shopping in 2016) • Compares same seasons in 2015 with seasons in 2016 (e.g there were more in Jul–Sept 2016 than in 2015) • Compares seasons within the same year (e.g in 2016 there were more customers in the summer months) • Compares increases / decreases in the number of customers, referring to gradients (e.g the biggest change was between Jul–Sept and Oct-Dec) Do not allow comparisons that only refer to the shape of the graph (e.g, it goes up and down again or it peaks in Jul–Sept) 1 mark for each acceptable comment - for 2 marks they must come from different categories	**2**	**B1** for 1 correct comment	If they make 3 comments mark the best 2. It is possible to cover 2 categories in one comment for 2 marks

Question			Answer	Marks	Part marks and guidance	
9	(a)		24 31	5	**M1** for 3X + 2Y = 134 oe **M1** for 2X + 5Y = 203 oe **M1** for multiplying both equations by scalars to equate coefficients of one variable (allow one arithmetic error) **M1** for correct method to eliminate one variable (allow one arithmetic error) if **M4** not scored award **B3** for one correct answer	allow any correct method e.g. substitution **M1** for rearranging one equation to make X or Y the subject, $X = \frac{134 - 2Y}{3}$ **M1** for substitution of *their* expression in the other equation
	(b)		Any correct comment relating to distance	1		See appendix
10	(a)		4200	1		
	(b)		3948 = 4200*r* oe 3948 ÷ 4200 = 0.94	B1 B1		Can be implied by e.g. second statement
	(c)		[0].4[0] × 4200 or 1680 4200 × ([0].94)^{15} or 1660[**.** …] 1660[**.** …] and1680 oe	 M1 M1 A1	accept any correct method e.g. **M1** for 4200 × 0.94^{15} or 1660[**.** …] **M1** for 1660[**.** …] ÷ 4200 [×100] implied by .395[…] or 39.5 to 39.6 **A1** for 60.4 to 60.5[…] or 39.5 to 39.6 with a suitable comment	Alternatives: **M2** for 0.94^{15} = .395[…] **A1** for 60.4 to 60.5[…]

Question			Answer	Marks	Part marks and guidance	
11	(a)		Correct translation	2	**B1** for a correct horizontal translation or a correct vertical translation	Condone freehand, points must be joined for **2** marks, **B1** if all correct and not joined
	(b)	(i)	rotation (0,0) oe 90° [anticlockwise] oe	1 1	if **0** scored **M1** for the triangle/dots on the grid correctly rotated twice for centre allow origin and O and for angle allow e.g. -270°, 270° clockwise	Double transformation can only score **M1**
		(ii)	Rotation (0,0) oe 180°	1 1 1	if **0** scored **M1** for the triangle /dots on the grid correctly reflected twice or **SC2** for "rotation (0,0) oe, 90°" written twice for centre allow origin and O	Allow enlargement (0,0) [sf=] -1 for **3** marks Other double transformations can only score **M1**
12			55 soi by 25 80 – *their*55 soi 25 [0].3[0] × 80 soi 24 25 and 24 so yes oe	B1 M1 M1 A1	condone if written on graph or *their* 25 ÷ 80 or 31[%] or 31.2 to 31.3[%] 31[%] or 31.2 to 31.3[%][and 30] so yes **A1dep** on both **M1**s and **A1FT** follow through from *their* 55	accept any correct method e.g **B1** for 55 **M2** for [0].7 × 80 soi 56 or **M1** for [0].3 × 80 soi 24 **A1** for 55 and 56 so yes

Question			Answer	Marks	Part marks and guidance	
13	(a)		[0].4, [0].3 and [0].8 oe in the correct places	1		Accept equivalent fractions or percentages with % sign in each part and **FT their tree diagram only if (a) scores 0 marks**
	(b)		[0].4 or $\frac{2}{5}$ oe	1	**FT** *their* tree diagram	accept 40%: condone $\frac{4}{1}$, penalise wrong form once eg 4 : 10, 4 in 10
	(c)		[0].7 or $\frac{7}{10}$ oe	1		accept 70%
	(d)		[0].08 or $\frac{2}{25}$ oe	2	FT *their* tree diagram for **2** marks **M1** for *their*[0].4 × [0].2	accept 8% and working may be in the tree
	(e)		[0].82 or $\frac{41}{50}$ oe	3	FT *their* tree diagram for **3** marks **M2** for 1 – [0].6 × *their* [0].3 or [0].6 × [0].7 + *their* [0].4 × *their* [0].8 + *their* [0].4 × [0].2 oe soi or **M1** for [0].6 × *their* [0].3 or two of [0].6 × [0].7, *their* [0].4 × *their* [0].8, *their* [0].4 × [0].2 oe soi	accept any correct method and working may be in tree implied by 1 - [0].18 implied by [0].42 + [0].32 + [0].08 implied by [0].18 implied by two of [0].42, [0].32, [0].08

Question			Answer	Marks	Part marks and guidance	
14			92 or 92.28 to 92.6	6	**M3** for correct explicit cos rule to find angle A in ADE with cos as subject. [cos A =] $\frac{28^2 + 41^2 - 22^2}{2 \times 28 \times 41}$ oe soi or **M2** for correct implicit form of the cos rule to find angle A $22^2 = 28^2 + 41^2 - 2\times28\times41\times\cos A$ or **M1** for either of the above forms with only one error AND **M2** for correct sine rule e.g. $\frac{64 \times \sin 72}{\sin theirA}$ oe soi or **M1** for $\frac{64}{\sin theirA} = \frac{[...]}{\sin 72}$ oe if **0** scored **SC1** for explicit form of cos rule to find angle D or E in ADE e.g. [cos D =] $\frac{28^2 + 22^2 - 41^2}{2 \times 28 \times 22}$	accept any correct method implied by [A=] 30.3 to 30.4

Question			Answer	Marks	Part marks and guidance	
15	(a)		14 – 15	1		
	(b)		30 from graph Starting with *their* 30 (using mph) *These method marks could be awarded in any order* × 60^2 soi ÷ 1000 soi ÷ 1.6 soi 67.5 so yes	B1 M1 M1 M1 A1	 Starting with 60 (using m/s) *These method marks could be awarded in any order* **M1** × 1.6 soi by 96 **M1** × 1000 soi **M1** ÷ 60^2 soi **B1** for 30 from graph **A1** for 26.6 to 26.7 and 30 so yes	accept any correct method e.g. (using km/hr) **M1** for 60 × 1.6 soi by 96 **B1** for 30 from graph Starting with *their 30* *These method marks could be awarded in any order* **M1** × 60^2 soi **M1** ÷ 1000 soi **A1** for 96 and 108 so yes
	(c)		Attempt at a tangent drawn at $t = 7$ 4.0 to 4.5 oe	B1 B2	 **M1** for an attempt at speed ÷ time, could be on the graph e.g. 30 ÷ 10 or *their* (a) ÷ 7 soi 2.07… or 2.14..	Accept answer as a fraction and tolerance on reading from graph ± ½ small square Gradient for M1 could be from a chord. Ignore any negative sign
	(d)		$v = kt^2$ where $0.25 \leq k \leq 0.33$	3	**SC2** for $v \propto kt^2$ where $0.25 \leq k \leq 0.33$ or **B1** for $v = kt^2$ AND **M1** for $30 = k(10)^2$ or FT *their* reading from the graph for values of v and t or **B1** for $0.25 \leq k \leq 0.33$	Condone use of other letters especially *s* for speed Can be implied by eg $30 = k(10)^2$ k could be a fraction e.g. $\frac{15}{49}$
	(e)		any correct comment e.g. graph only valid/information only available up to 10 secs or car will eventually reach max. speed	1		See appendix

Question			Answer	Marks	Part marks and guidance	
16			$(x - 5)^2$ final answer −9 final answer	1 2	 **FT** *their* $(x - 5)^2$ final answer	
17			circle centre (0, 0) oe and radius 3	1 1	condone circular accept origin or O for (0,0)	
18	(a)		$(2x - 3)(x + 4)$ oe 1.5 oe and −4	2 1	**M1** for any two factors that give two correct terms when expanded Correct or **FT** *their* two factors	If they use another method then award **B1** for both answers correct.
	(b)		[0].72 −1.39	3	**M2** for one correct answer or $\frac{-2 \pm \sqrt{2^2 - 4 \times 3 \times -3}}{2 \times 3}$ or better or **M1** for this formula with at most two errors if **0** scored allow **SC1** for answers [0].720… or [0].721 and –1.38…..	for completing the square **M1** for $(x + \frac{1}{3})^2 - \frac{10}{9}$ **M1** for $\sqrt{\frac{10}{9}} - \frac{1}{3}$
19	(a)		$\frac{n^2}{n+1}$	2	**B1** for n^2 or $n + 1$	
	(b)		[a =] 3 [*b* =] 1 [*c* =] - 2	4	**B2** for [a =] 3 or **M1** for second differences = 6 and **M1** for revised differences of -1 0 1 2 or **B1** for *b* or *c* correct	accept any correct method see notes

Question			Answer	Marks	Part marks and guidance	
20			evidence of finding the area under the graph	M1	**M1** for evidence of any correct method to find the area under the graph e.g. counting squares (numbers or dots in squares) or use of triangles, trapeziums or rectangles	
			15 to 22	B1		accept answer as a fraction

APPENDIX

Exemplar responses for Q9(b)

Response	Mark
He does no other driving other than routes X and Y in the week	1
There are no diversions or detours	1
He sets off from the same place each time	1
That he only drives these two routes	1
They are the same 2 routes and never change	1
He could of gone to other routes as well as X & Y routes. He didn't drive anywhere else.	1
That Dan isn't driving anywhere else during the week	1
The routes are correctly measured	1
He takes exactly the same route each time.	1
He hasn't taken any breaks	0
There are no stops	0
There is no traffic jams	0
He does not cancel his drive	0
That no stops in petrol stations were made	0
Y has a longer route than X	0
Dan prefers to drive route Y as he has driven it more than route X	0
He didn't drive route X or Y there and back	0
That there is no traffic or road works	0

Exemplar responses for Q15(e)

Response	Mark
graph only valid/information only available up to 10 secs	1
car will eventually reach max. speed	1
It could stay at a constant speed	1BOD
It gains enough acceleration its speed becomes constant	0
He drove the whole route	0

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