AQA

GCSE
Mathematics

8300/3F – Paper 3 Foundation Tier
Mark scheme

June 2018

Version/Stage: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

If a student uses a method which is not explicitly covered by the mark scheme the same principles of marking should be applied. Credit should be given to any valid methods. Examiners should seek advice from their senior examiner if in any doubt.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special case. Marks awarded for a common misinterpretation which has some mathematical worth.
M dep	A method mark dependent on a previous method mark being awarded.
B dep	A mark that can only be awarded if a previous independent mark has been awarded.
oe	Or equivalent. Accept answers that are equivalent. eg accept 0.5 as well as $\frac{1}{2}$
[a, b]	Accept values between a and b inclusive.
[a, b)	Accept values $a \leq$ value $< b$
3.14…	Accept answers which begin 3.14 eg 3.14, 3.142, 3.1416
Use of brackets	It is not necessary to see the bracketed work to award the marks.

Examiners should consistently apply the following principles

Diagrams

Diagrams that have working on them should be treated like normal responses. If a diagram has been written on but the correct response is within the answer space, the work within the answer space should be marked. Working on diagrams that contradicts work within the answer space is not to be considered as choice but as working, and is not, therefore, penalised.

Responses which appear to come from incorrect methods

Whenever there is doubt as to whether a student has used an incorrect method to obtain an answer, as a general principle, the benefit of doubt must be given to the student. In cases where there is no doubt that the answer has come from incorrect working then the student should be penalised.

Questions which ask students to show working

Instructions on marking will be given but usually marks are not awarded to students who show no working.

Questions which do not ask students to show working

As a general principle, a correct response is awarded full marks.

Misread or miscopy

Students often copy values from a question incorrectly. If the examiner thinks that the student has made a genuine misread, then only the accuracy marks (A or B marks), up to a maximum of 2 marks are penalised. The method marks can still be awarded.

Further work

Once the correct answer has been seen, further working may be ignored unless it goes on to contradict the correct answer.

Choice

When a choice of answers and/or methods is given, mark each attempt. If both methods are valid then M marks can be awarded but any incorrect answer or method would result in marks being lost.

Work not replaced

Erased or crossed out work that is still legible should be marked.

Work replaced

Erased or crossed out work that has been replaced is not awarded marks.

Premature approximation

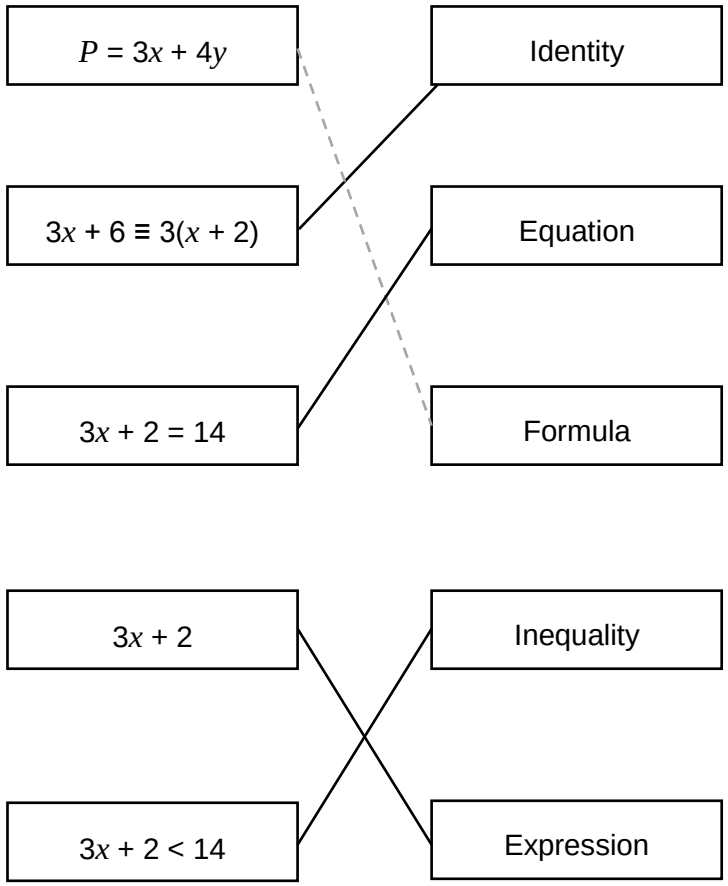
Rounding off too early can lead to inaccuracy in the final answer. This should be penalised by 1 mark unless instructed otherwise.

Continental notation

Accept a comma used instead of a decimal point (for example, in measurements or currency), provided that it is clear to the examiner that the student intended it to be a decimal point.

Question	Answer	Mark	Comments
1	$\frac{7}{100}$	B1	
	Additional Guidance		
2	$x = \frac{2}{3}$	B1	
	Additional Guidance		
3	A	B1	
	Additional Guidance		
4	1200 cm	B1	
	Additional Guidance		
5(a)	8 squares shaded	B1	
	Additional Guidance		
5(b)	2 squares shaded	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
6	**Alternative method 1**		
	19 × 28 or 532	M1	
	their 532 – 379	M1dep	
	153	A1	
	Alternative method 2		
	379 ÷ 19 or 19.9…	M1	implied by [8.05, 8.1]
	(28 – their 19.9…) × 19	M1dep	implied by [152.95, 153.9]
	153	A1	
	Additional Guidance		
	152.95 from (28 – 19.95) × 19		M1M1A0

Question	Answer	Mark	Comments
7	All four correct	B3	B2 for any two or three correct B1 for any one correct
	Additional Guidance		
			
	Do not accept two lines from an algebra box		

Question	Answer	Mark	Comments
8	20, 20, 20, 10, 5, 5	B2	Any order B1 for 20, 20, 10, 5, 5, 5 or 20, 20, 10, 10, 5, 5 or 20, 20, 20, 20, 10, 5
	Additional Guidance		
	Mark answer line first, if blank look for clear indication of six banknotes in working		
	20 × 3, 10, 5 × 2		B2
	Answer not using six banknotes		B0
	Answer using values other than 5, 10 or 20		B0
9(a)	$\frac{1}{10}$ or 0.1(0) or 10%	B1	oe
	Additional Guidance		
	Ignore further working with any description of probability eg $\frac{1}{10}$, unlikely		B1
	Ignore further working with attempt to simplify a correct fraction eg $\frac{10}{100} = \frac{5}{20}$		B1
	1 : 10 in working with $\frac{1}{10}$ on answer line		B1
	1 : 10 on answer line		B0
	1 out of 10 without $\frac{1}{10}$ in working		B0

Question	Answer	Mark	Comments
9(b)	ABC BAC CAB ACB BCA CBA	B2	Any order B1 for four additional correct orders with no errors or repetitions or five additional correct orders with at most one error or repetition
	Additional Guidance		
	Do not allow repetition of ABC for B2		

Question	Answer	Mark	Comments
10	**Alternative method 1**		
	2 (cm) and 10 (cm) or (scale factor =) 5	M1	each ± 0.2 cm oe implied by 650 in working
	130 × 5 or 130 ÷ their 2 × their 10	M1dep	oe
	650	A1ft	ft [1.8, 2.2] and [9.8, 10.2] SC2 [635, 665]
	Alternative method 2		
	2 (cm) and 130 ÷ their 2 or 65	M1	± 0.2 cm
	10 (cm) and their 65 × their 10	M1dep	± 0.2 cm
	650	A1ft	ft [1.8, 2.2] and [9.8, 10.2] SC2 [635, 665]
	Additional Guidance		
	Do not accept marked graduations on diagram as a scale factor		
	Allow consistent use of mm throughout		
	2 and 9.9 followed by 130 ÷ 2 × 9.9 with answer 643.5 or 644		M1M1A1ft
	130 × 4 + 124 = 644		SC2
	2.1 and 10.1 followed by 130 ÷ 2.1 × 10.1		M1M1
	130 × 4 (= 520) + 130		M1M1
	(130 × 5 =) 650 followed by 650 – 130		M1M0
	(130 × 5 =) 650 followed by 130 × 650 = 84 500		M1M0
	1:5 or 5:1 is oe (scale factor =) 5		M1
	130 × 4 (= 520)		M0

Question	Answer	Mark	Comments
11	No and gives a correct reason	B1	eg the cup is narrower at the bottom the top of the cup is wider the radius of the cup is not constant
	Additional Guidance		
	Ignore irrelevant statements with valid reasons		
	A correct reason will usually reference volume, capacity, surface area, width of the cup or that the shape of the cup is not uniform		
	No, volume at top is greater than bottom		B1
	No, more area at top		B1
	No, wider diameter at top		B1
	No, doesn't take account of volume (capacity)		B1
	No, because it's cone shaped (condone use of cone)		B1
	No, the cup goes down in circumference as you begin to drink		B1
	No, the cup is not uniform		B1
	No, she is talking about the height not the volume		B1
	No, there is a larger volume in the top half		B1
	No, more coffee in top half (coffee implies capacity)		B1
	No, the cup has a changing volume		B1

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Question	Answer	Mark	Comments
11 cont	No, it's not a cylinder		B0
	No, there would be 5cm if it was rectangular or square but it is cone shaped so 5cm is not left		B0
	No, top half is more (than bottom half) (no reference to volume)		B0
	No, the cup gets smaller		B0
	No, because of the shape of the cup		B0
	No, the cup is not straight		B0
	No, the cup does not have a symmetrical shape		B0
	No, because the volume of coffee is not measured in cm		B0
	No, because 10cm is the measurement of the cup, not the volume (no reference to height)		B0

Question	Answer	Mark	Comments
12(a)	**Alternative method 1**		
	512 ÷ 743 or 0.6 or 0.68… or 0.69 or 758 ÷ 1065 or 0.7 or 0.71…	M1	oe
	0.6 or 0.68… or 0.69 and 0.7 or 0.71… and Week 2	A1	
	Alternative method 2		
	512 ÷ 231 or 2.2 or 2.21… or 2.22 or 758 ÷ 307 or 2.4 or 2.46… or 2.47 or 2.5	M1	oe
	2.2 or 2.21… or 2.22 and 2.4 or 2.46… or 2.47 or 2.5 and Week 2	A1	
	Alternative method 3		
	$\frac{512}{743}$ or $\frac{758}{1065}$	M1	$\frac{512}{231}$ or $\frac{758}{307}$
	$\frac{545280}{791295}$ and $\frac{563194}{791295}$ and Week 2	A1	$\frac{157184}{70917}$ and $\frac{175098}{70917}$ and Week 2

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Question	Answer	Mark	Comments

	Additional Guidance	
12(a) cont	Accept working in percentages	
	Proportions can be calculated using reciprocals in both Alternative method 1 and Alternative method 2 eg 231 ÷ 512	
	60(%) or 68(%) or 69(%) or 70(%) or 71(%)	M1
	(10% = 74.3 followed by) $\frac{512}{74.3} \times 10$ or (10% = 106.5 followed by) $\frac{758}{106.5} \times 10$ is oe for Alternative method 1	M1

Question	Answer	Mark	Comments
12(b)	396 × 3.74 or 1481.04 or 164 × 5.29 or 867.56 or 362 × 0.51 or 184.62 or 143 × 0.04 or 5.72	M1	oe Week 2 profit on 10-inch pizzas Week 2 profit on 12-inch pizzas Week 2 loss on 10-inch pizzas Week 2 loss on 12-inch pizzas
	their 1481.04 + their 867.56 or 2348.6(0) or their 184.62 + their 5.72 or 190.34 or their 1481.04 – their 184.62 or 1296.42 or their 867.56 – their 5.72 or 861.84	M1dep	oe Week 2 profit for both pizzas Week 2 loss for both pizzas Week 2 profit – loss on 10-inch pizzas Week 2 profit – loss on 12-inch pizzas
	their 2348.6(0) – their 190.34 or their 1296.42 + their 861.84 or 2158.26	M1dep	Total week 2 profit from total profit – total loss
	(£)87.71 or (£)262.71 and Yes or (£)1983.26 and Yes or (£) 2158.26 and (£)2070.55 and Yes	A1	Total week 2 profit – (total week 1 profit + cost of adverts) Total week 2 profit – total week 1 profit Total week 2 profit – cost of adverts Condone eg £87.71p

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Question	Answer	Mark	Comments

	Additional Guidance	
12(b) cont	Accept use of inequality sign or words to imply “Yes” in final answer	
	Accept –184.62 and –5.72 for first M1	
	Accept working in pence to calculate losses for M1	
	2070.55 is total week 1 profit + cost of adverts	
	Answer of (£)87.71 does not require “Yes” to be stated as the advert cost has been subtracted	M1M1M1A1

Question	Answer	Mark	Comments
13	**Alternative method 1**		
	60 ÷ 5 or 12 or 3.5 ÷ 5 or 0.7	M1	oe
	their 12 × 3.5 or their 0.7 × 60	M1dep	oe
	42	A1	
	Alternative method 2		
	7 (miles) in 10 (minutes) or 10.5 (miles) in 15 (minutes) or 14 (miles) in 20 (minutes) or 21 (miles) in 30 (minutes) or 35 (miles) in 50 (minutes)	M1	
	7 × 6 or 10.5 × 4 or 14 × 3 or 21 × 2 or 35 + 3.5 × 2	M1dep	oe
	42	A1	
	Alternative method 3		
	5 ÷ 60 or 0.08(3…)	M1	oe
	3.5 ÷ their 0.08(3…)	M1dep	oe
	42	A1	Accept [42, 42.2]
	Additional Guidance		
	$\frac{5}{60}$ or $\frac{1}{12}$ is oe 0.08(3…)		M1

Question	Answer	Mark	Comments
14	0.5 × 9 × 5.6	M1	oe
	25.2	A1	
	Additional Guidance		
	25 on answer line with 25.2 in working		M1A1
	25 on answer line with no or incorrect working		M0

Question	Answer	Mark	Comments
15	A correct trial using one from a multiple of 7 subtracted from 36 a multiple of 7 plus three equal whole numbers three equal whole numbers subtracted from 36 or Lists four whole numbers, of which three are equal, that sum to 36 or Lists four whole numbers that sum to 36 with at least one multiple of 7	M1	eg 36 – 7 = 29 eg 21 + 4 + 4 + 4 = 33 eg 8 + 8 + 8 = 24 and 36 – 24 = 12 eg 6, 6, 6, 18 eg 14, 10, 8, 4
	21, 5, 5, 5	A1	
	2625	A1ft	ft correct multiplication of their four positive whole numbers with M1 awarded
	Additional Guidance		
	A correct trial or list must only use positive whole numbers		
	21 + 4 + 4 + 4 = 33 followed by (21 × 4 × 4 × 4 =) 1344		M1A0A1ft
	28, 2, 3, 3 (list sums to 36) followed by (28 × 2 × 3 × 3 =) 504		M1A0A1ft
	14, 10, 8, 4 followed by (14 × 10 × 8 × 4 =) 4480		M1A0A1ft
	8 + 8 + 8 = 24 and 36 – 24 = 12 followed by (8 × 8 × 8 × 12 =) 6144		M1A0A1ft
	6 × 6 × 6 × 18 = 3888		M1A0A1ft
	13, 10, 8, 5 followed by (13 × 10 × 8 × 5 =) 5200		M0A0A0ft
	0, 12, 12, 12		M0

Question	Answer	Mark	Comments
16	*AC* has length [7.8, 8.2] cm and Angle *CAB* is [35, 39]° and full triangle is drawn	B2	B1 for *AC* has length [7.8, 8.2] cm and if redrawn *AB* has length [10.8, 11.2] cm or Angle *CAB* is [35, 39]°
	Additional Guidance		
	Ignore labelling		
	Sides need to be ruled for B2		
	If *AB* is redrawn, it must have length [10.8, 11.2] cm for B2		
	If two triangles drawn, the one on the given line *AB* takes precedence, unless crossed out		
17	$6x$	B1	
	Additional Guidance		
18	2049	B1	
	Additional Guidance		

Question	Answer	Mark	Comments
19(a)	360 – 72 – 90 or 198	M1	oe 100(%) – 20(%) – 25(%) or 55(%)
	their 198 ÷ 3 (× 2) or 66 or 132	M1	Correct line drawn implies M1M1 their 55 ÷ 3 (× 2) or 18(.3…) or 36(.6…) or 37
	Correct line drawn within 2° and sections labelled correctly	A1	L in the section with [130°, 134°] M in the section with [64°, 68°]
	Additional Guidance		
	Correct line drawn must be a ruled line for A mark		
	Angles may be on the diagram		
	Mark diagram first, if line out of tolerance, check working for method marks		
19(b)	16 200 ÷ 360 or 45 or 360 ÷ 16 200 or 0.022… or 16 200 × $\frac{72}{360}$	M1	oe
	3240	A1	
	Additional Guidance		
	Do not ignore further working		
	16 200 – 3240 = 12 960		M1A0
	$\frac{3240}{16200}$ on answer line		M1A0
	16 200 ÷ 4 ÷ 90		M1
	16 200 ÷ 5		M1
	20% of 16 200 without further correct working		M0

Question	Answer	Mark	Comments
20	0.8	B1	
	Additional Guidance		
21	$f = \frac{e}{2}$	B1	
	Additional Guidance		
22(a)	(10 + 6) ÷ 2 or 8 as fourth term	M1	oe
	(their fourth term + 6) ÷ 2 or 7 as fifth term	M1	oe
	8 and 7 and 7.5	A1	
	Additional Guidance		
	8, 7, 7.5 with no working seen or on dotted lines		M1M1A1
	The fourth or fifth term must come from a correct method		
	14, 10, 12		M0M1
	14, 10, 18 without seeing correct method (14, 10, 18 is from using the pattern +8, –4)		M0M0

Question	Answer	Mark	Comments
22(b)	**Alternative method 1**		
	9.5 × 2 or 19 or 19 ÷ 2 (= 9.5)	M1	oe
	their 19 – 4	M1dep	
	15	A1	
	Alternative method 2		
	9.5 – 4 or 5.5	M1	
	their 5.5 + 9.5	M1dep	
	15	A1	
	Alternative method 3		
	$\frac{x+4}{2}$ = 9.5	M1	oe
	x + 4 = 19	M1dep	
	15	A1	
	Alternative method 4		
	9.5 – 4 ÷ 2 or 7.5 or 4 ÷ 2 + 7.5 = 9.5	M1	
	their 7.5 × 2	M1dep	
	15	A1	
	Additional Guidance		
	If answer line blank look for clear indication of second term on dotted line		
	4 + 15 = 19, 19 ÷ 2 = 9.5 with incorrect answer or blank answer line		M1M1A0
	2 + 7.5 = 9.5 followed by 7.5 + 7.5		M1M1

Question	Answer	Mark	Comments
23	Any two of Indication that there should be a number in the overlapping part Indication that the 12 should be inside the rectangle The numbers add up to 22 The universal set has not been defined	B2	B1 for any one correct criticism eg the numbers should be 5, 2, 1, 12 there should be 2 in the overlap eg 12 should be inside 12 shouldn't be outside
	Additional Guidance		
	Criticisms must be written on answer line		
	If a number in the overlapping part is specified in a criticism, it must be 2		
	12 written inside the rectangle with no or irrelevant comment		B0
	Accept a correct first criticism with an incorrect linked second criticism eg Criticism 1 – Should be 2 in the centre section Criticism 2 – Should be 7, 2, 3, 10		B1 B0
	Do not accept a correct and incorrect statement for the same criticism eg There should be 2 in the middle, so the numbers should be 7, 2, 3, 12		B0
	Examples of correct criticisms		
	Does not add up to 20		B1
	There's no number in the centre		B1
	12 is on the outside		B1
	He must have asked 22 people		B1
	Should be 7 – 2, 2, 3 – 2 (or 5, 2, 1)		B1

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23 cont	7 (or 3) is wrong	B1
	Some people have a dog and a cat	B1
	Examples of incorrect criticisms	
	Some pet owners might have a dog and a cat	B0
	12 should be inside the circle	B0
	7 means the whole circle not just the outside bit	B0
	12 should be 10	B0
	He hasn't written how many have neither	B0
	There is no title for both	B0
	You have to work out the middle for yourself	B0

Question	Answer	Mark	Comments
24	At least two common factors of 72 and 120 from 2, 3, 4, 6, 8, 12, 24 or 72 = 2 (×) 2 (×) 2 (×) 3 (×) 3 or 120 = 2 (×) 2 (×) 2 (×) 3 (×) 5	M1	May be seen on a diagram, eg factor tree
	At least two common multiples of 6 and 9 from 18, 36, 54…	M1	
	(HCF =) 24 selected from factors or a = 24 or (LCM =) 18 selected from multiples or b = 18	M1	oe eg HCF = 2 (×) 2 (×) 2 (×) 3 24 can be implied from their numerator oe eg LCM = 2 (×) 3 (×) 3 18 can be implied from their denominator oe eg $\frac{2 \times 2 \times 2 \times 3}{2 \times 3 \times 3}$
	$1\frac{1}{3}$ or $\frac{4}{3}$ or 1.33…	A1	oe Accept $\frac{24}{18}$ Ignore further incorrect cancelling
	Additional Guidance		
	HCF = 24 and LCM = 18		M1M1M1
	HCF = 24		M1M0M1
	LCM = 18		M0M1M1

Question	Answer	Mark	Comments
25	54	B1	May be on diagram
	7.5 6	B2	May be on diagram B1 for 1 correct or for answers transposed
	Additional Guidance		
	If answers are in wrong position on answer lines, check working and diagram for clear indication of possible transcription errors eg $w = 9 \div 1.5 = 6$ in working, 9 on answer line $9 \div 1.5 = 6$ in working, 9 on answer line		 B1 B0
	Answer line takes precedence over diagram eg $x = 54$ on diagram and $x = 81$ on answer line		B0

Question	Answer	Mark	Comments
26	$2 \times 12 \times 150 \times 1.025$ or $24 \times 150 \times 1.025$ or 3690 or $2 \times 12 \times 150 \times 0.025$ or $24 \times 150 \times 0.025$ or 90	M1	Investment A oe
	1.03×3500 or 3605	M1	Investment B oe eg $0.03 \times 3500 + 3500$ or $105 + 3500$ May be implied from $1.03^2 \times 3500$
	$1.03^2 \times 3500$ or $1.03 \times$ their 3605 or 1.0609×3500 or 3713(.15) or $0.03 \times$ their 3605 or 108(.15)	M1dep	oe Dependent on 2nd M1
	23.15	A1	Condone £23.15p
	Additional Guidance		
	If build up methods are used they must be complete		
	1% = 35 3% = 95 (error without showing method) 95 + 3500 or 3595		M0
	1% = 35 3% = 35 × 3 = 95 (error but correct method shown) 95 + 3500 or 3595		M1
	$1.03^3 \times 3500$ (full method incorrect but implies 1.03×3500)		M0M1M0

Question	Answer	Mark	Comments
27(a)	**Alternative method 1** – Using gradients		
	Gradient of $y = 3x + 7$ is 3 and $y = 3x + 4$ and gradient of $2y – 6x = 8$ is 3 or $6 \div 2$	B3	May come from using points on line eg using (0, 7) and (1, 10) and $\frac{10 – 7}{1 – 0} = 3$ or correct calculation for gradient from points on line $2y – 6x = 8$ eg using (0, 4) and (1, 7) and $\frac{7 – 4}{1 – 0} = 3$ B2 for $y = 3x + 4$ and lines have same gradient or $y = 3x + 4$ and gradient of $2y – 6x = 8$ is 3 or $6 \div 2$ or gradient of $y = 3x + 7$ is 3 and $y = 3x + 4$ B1 for gradient of $y = 3x + 7$ is 3 or $y = 3x + 4$ or gradient of $2y – 6x = 8$ is 3 or $6 \div 2$
	Alternative method 2 – Using coordinates and distances		
	Chooses a value for x and correctly evaluates the y value for both lines	M1	eg (0, 7) and (0, 4)
	Chooses a different value for x and correctly evaluates the y value for both lines	M1dep	eg (1, 10) and (1, 7)
	States that y values are a constant distance apart so parallel	A1	oe

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27(a) cont	**Alternative method 3** – Using simultaneous equations		
	$y = 3x + 4$ or $y - 3x = 4$ or $2y = 6x + 14$ or $2y - 6x = 14$	M1	oe Equates coefficients in any form
	Any attempt to eliminate both variables from their equations	M1dep	
	States simultaneous equations have no (real) solution and concludes parallel	A1	
	Additional Guidance		
	To award A mark on Alternative method 2, the working must be seen		
	$y = 3x + 4$ and lines have gradient of $3x$		B2
	$y = 3x + 4$ and $3x$ identified in both equations		B2
	Both lines have gradient $3x$		B1
	$y = 3x + 7$, gradient 3 and $y = 3x + 8$, gradient 3 (error in rearrangement)		B1
	$y = 3x + 8$, gradient 3 (error in rearrangement)		B0
	Parallel as both have same gradient		B0
	$2(3x + 7) - 6x = 8$ $6x + 14 - 6x = 8$ $14 = 8$		M1 M1
	$y = 3x + 7$ and $y = \frac{8 + 6x}{2}$ are equated coefficients, Alternative method 3		M1

Question	Answer	Mark	Comments
27(b)	3 × –5 + 7 or –15 + 7 or –8 or (–5, –8) or (–6 – 7) ÷ 3 or –4.33… or $y = 3x + 9$	M1	Use a point on $y = 3x + 7$ with (–5, –6) to compare gradient to 3 eg Gradient from (–5, –6) to (0, 7) is 2.6
	Above and –8 or Above and –4.33 or Above and $y = 3x + 9$	A1	oe Above and eg Gradient from (–5, –6) to (0, 7) is 2.6
	Additional Guidance		
	Do not ignore incorrect statements eg –6 is less than –8 so above		M1A0
	(0, 7), (–1, 4), (–2, 1), (–3, –2), (–4, –5), (–5, –8) and ticks below		M1A0

28	1.1 seen or 110% = 19.25 seen or 19.25 ÷ 110	M1	oe eg 10% = 1.75 1% = 0.175
	19.25 ÷ 1.1 or 0.175 × 100 or 17.5	M1dep	oe
	17.50	A1	correct money notation
	Additional Guidance		
	Condone £17.50p		M1M1A1
	Answer £17.5		M1M1A0

Question	Answer	Mark	Comments
29	55 and 91	B3	B2 for (7), 19, 31, 43, 55, 67, 79, 91 or 55 identified with 0 or 1 incorrect answer or 91 identified with 0 or 1 incorrect answer or 55 and 91 identified with 1 incorrect answer B1 at least 2 correct two-digit numbers from the sequence seen
	Additional Guidance		
	The correct sequence is (7), 19, 31, 43, 55, 67, 79, 91 Ignore continuation of sequence beyond 91		
	Ignore further working unless contradictory		
	55 and 91 identified and 5^{th} and 8^{th} terms stated (ignore fw)		B3
	55 and 91 identified and answer 2 (or there are 2) (ignore fw)		B3
	55 identified and 5^{th} stated (ignore fw)		B2
	Condone 5 or 5^{th} as final answer provided there is a clear link to 55 eg $12 \times 5 = 60 - 5 = 55$ $55 \div 11 = 5$ 5 on answer line		B2
	Condone 8 or 8^{th} as final answer provided there is a clear link to 91 eg $12 \times 8 = 96 - 5 = 91$ 8 on answer line		B2

Question	Answer	Mark	Comments
30(a)	$\begin{pmatrix}1\\-1\end{pmatrix}$	B2	B1 for 1 correct value in correct position Condone a divisor line
	Additional Guidance		
30(b)	$\begin{pmatrix}6\\-10\end{pmatrix}+\begin{pmatrix}2\times-4\\2\times7\end{pmatrix}$ or $\begin{pmatrix}6\\-10\end{pmatrix}+\begin{pmatrix}-8\\14\end{pmatrix}$ or $\begin{pmatrix}-2\\4\end{pmatrix}$	M1	oe
	$\begin{pmatrix}-2\\4\end{pmatrix} = 2\begin{pmatrix}-1\\2\end{pmatrix}$ or $\begin{pmatrix}-2\\4\end{pmatrix}$ and k = 2 or $2\mathbf{b} = \begin{pmatrix}-2\\4\end{pmatrix}$	A1	oe
	Additional Guidance		
	Condone vectors written as coordinates, eg (–1, 2) is half of (–2, 4)		
	Must see $\begin{pmatrix}-2\\4\end{pmatrix}$ or (–2, 4) to award the A mark		
	Condone missing brackets and divisor lines		
	$\begin{pmatrix}-2\\4\end{pmatrix}$ seen and **a** + 2**c** is 2**b**		M1A1
	$\begin{pmatrix}-2\\4\end{pmatrix} \div 2 = \begin{pmatrix}-1\\2\end{pmatrix}$		M1A1
	$\begin{pmatrix}6\\-10\end{pmatrix}+2\begin{pmatrix}-4\\7\end{pmatrix}$		M0