GCSE MARKING SCHEME

MATHEMATICS - UNITISED

NOVEMBER 2011

INTRODUCTION

The marking schemes which follow were those used by WJEC for the November 2011 examination in GCSE MATHEMATICS - UNITISED. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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UNIT 1 - FOUNDATION TIER

NOVEMBER 2011 UNIT 1 Foundation	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 1)
1. Sight of 2·5(kg) OR 2½(kg) 2·5 × (£)1.3(0) = (£)3.25	B1 M1 A1 3	F.T. 'their scale reading' × (£)1.3(0)
2. (a) Blue 12 Cream 18 Yellow 10	B2	For all three correct. B1 for one (or two) correct. Allow unambiguous indication in either 'Tally' or 'Frequency' column (Frequency column takes precedence).
(b) Blue, Cream and Yellow along one axis.	B1	**Or** indicated on the bars themselves. Accept B,C and Y. Ignore widths of bars.
Uniform scale starting at 0.	B1	B0 for ambiguous placing of numbers between grid lines.
Three bars at correct heights	B2 6	B1 for two correct heights. **F.T.** their frequencies. If no scale assume one square to represent a frequency of 1. Mark heights on uniform scale that does not start at 0 (e.g. starts at 1) accordingly.
3. (a) Moscow, Berlin, Cardiff, Athens, Dublin. (b) 7(°C) (c) 8(°C)	B1 B1 B1 3	Accept unambiguous correct order e.g. –7,–3, 0, 2, 3. Accept –7. B0 for -8
4. 22:05 OR 10.05(p.m.)	B1	Accept any unambiguous indication that the correct time has been chosen.
15(min) or ¼ (hour)	B1 2	Accept 45(min) or ¾ (hour) if 2235 or 10.35p.m. given in first part.
5. 5 ÷ 0·34 or 500 ÷ 34 (= 14·7....) = 14 (peaches)	M1 A1	Accept any attempt to find how many 34s in 500.
(change =) (£)5 – 14×0·34	M1	F.T. their number of peaches only if greater than 1 and less than 14.
= (£) 0.24	A1 4	Accept 24(p). Allow £0.24p but <u>not</u> 0.24p.
6. (Time =) (2 +) 9 × 30(min)	M1 M1	Sight of 9 × 30 gains M1 BUT make sure that it is 'Time' that is being found. So, for example, 9 × £30 or 25 + 270 will be M0 as 'Money' is implied.
= (2 +) 9 × ½ (hr)	A1	Sight of 4½(hrs) or 4hr 30min. gains both M marks. May be implied in work that shows understanding of correct relationship between hours and minutes.
= 6½(hrs) OR 6hrs 30min		Accept rounding up to nearest whole hour above.
(Charge=) (£)25 + 6½ × (£)30	M1	F.T. 'their time <u>given in hours</u>' OR 'their time rounded to the nearest whole hour above'.
= (£)220	A1 5	SC1 for (£)195 (call-out charge not included)

NOVEMBER 2011 UNIT 1 Foundation	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 2)
7. (a) 18 + 1·2 OR 18000 + 1200 (Total weight =) 19·2(kg) OR 19200(g) 0·8(kg) (under) OR 800(g) (under) Look for • spelling • clarity of text explanations and correct units shown • the use of notation (watch for the use of '=', '+' being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer (b) 50 ÷ 2·2 OR 20(kg) = 20 × 2·2 (lbs) = 22(·727...) or 23 = 44(lbs) Luggage is over weight limit.	M1 A1 A1 QWC2

NOVEMBER 2011 UNIT 1 Foundation	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 3)
11. Labelling litres and uniform scale on vertical axis Uniform scale on horizontal axis Plotting at least two correct points. Correct line drawn Any correct strategy, e.g 10 times value at 35 litres. A correct answer <u>for their line.</u>	B1 B1 P1 L1 M1 A1 6	 *P0,L0 if no attempt at uniform scaling.* <u>+</u> '½ small square'. The origin may be one of the points. Correct line implies P1L1. M0 if inappropriate scale used. E.g. 350 litres on scale. F.T. their line. Allow M1,A1 for unsupported answers between 76 and 78 inclusive or if graph not used.
12. B C A	B1 B1 B1 3	
13. Showing a strategy to find total 'running time' and total 'walking time' OR use of km/min. Runs for 50min AND Walks for 10min. Use of Distance = Time × Speed Runs 18 × 50/60 (= 15km) Walks 6 × 10/60 (= 1km) (Distance =) 16 (km)	S1 B1 M1 m1 m1 A1 6	E.g. 'Running time' + 'walking time' = 60 minutes. OR 'Ten repeats of 5min running and 1min walking' is enough for S1B1 Allow this M1 even if time in minutes and speed per hr. F.T. their 'running time' if less than 60minutes. F.T. their 'walking time' if less than 60minutes and not equal to 'running time'.
14. $\frac{23970 - 23500}{23500} \times 100 = 2(\%)$	M1 m1 A1 3	*Look out for those who incorrectly use 23970 as a denominator (giving an answer of 1·96....%) which is then approximated to 2%. M0m0A0.*
15. Least Value 19·5 745 Greatest Value 20·5 755	 B4 4	B1 for each correct entry. Accept 20·49 recurring but not 20·49. Accept 754·9 recurring but not 754·9.

UNIT 2 - FOUNDATION TIER

2011 Autumn UNIT 2 (Non calculator) Foundation Tier	**Marks**	**FINAL POST CONFERENCE MARK SCHEME Comments (21/11/2011) (Page 1)**
1. (a) (i) Eleven thousand three hundred and sixty five (pounds) (ii) (£) 110680(.00p) (b) (i) 30 (ii) 25 (iii) 29 OR 31	B1 B1 B1 B1 B1 5	 **Accept 5×5 OR 5^2** For either or both, but B0 if any incorrect number given
2. (a) 700 OR 7 hundred (b) 1, 3, 9, 27 (c) (d) £5 – 5 × **90(p)** = 50**(p)** (e) 3 × 70 = 210	B1 B2 B1 B1 B1 M1 A1 M1 A1 10	Do not accept hundred(s) B1 for any 2 or 3 factors and no incorrect numbers OR for all 4 factors and 1 incorrect number. **60/100 gets B0** Intention to subtract as many 90p as possible allowing for arithmetical errors. **Allow £.50p for the A1, but .50p or £50 get A0.** **The 3 must not be changed. The 69.8 must be changed to a whole number. Only 3 × 70 = 210 gets M1, A1.** **All others, for example, 3 × 69 (= 207) get M1, A0.**
3. (a) (b) unlikely	B1 B1 B1 B1 4	A should be at the half way mark **B should be to the right of the 'd' and up to 1 exclusive** C should be at 0.
4. (a) 2 rectangles of 6 by 4·5 2 rectangles of 3 by 4·5 1 rectangle of 6 by 3 Makes a correct net (b) 4 (c)	B1 B1 B1 B1 B1 B2 7	Use overlay (±2mm) B1 for all 4 correct squares and one extra OR 2/3 correct squares and no incorrect squares
5. A (- 4, 4) B (0, -2) C (-1, -3)	B1 B1 B1 3	Allow the marks even if only the letters as long as it is clear that the correct point is being indicated. **Reverse coordinates gets B0 on every occasion.**

2011 Autumn UNIT 2 (Non calculator) Foundation Tier	Marks	FINAL POST CONFERENCE MARK SCHEME Comments (21/11/2011) (Page 2)	
6. (a) [11 12 13] 21 22 23 31 32 33 41 42 43 51 52 53 61 62 63	B2	**B1 for at least 9 correct entries**	**IF their sample space has more than 18 entries (including the given 3), then B0 for (a) and F.T. in parts (b) and (c) where possible**
(b) 3/18 ISW (= 1/6)	B2	F.T. their table B1 for a numerator of 3 in a fraction less than 1. B1 for a denominator of 18 in a fraction less than 1. Do not penalise incorrect reduction of fractions.	NOTES Penalise –1 for use of words such as "3 out of 18", "3 in 18" OR "3:18". When fraction and wrong notation seen, DO NOT penalise wrong notation.
(c) (i) 6/18 I.S.W (= 1/3)	B1	F.T. 'their sample space in (a) if at least B1 awarded	
(ii) 12/18 I.S.W (= 2/3)	B1	F.T. 1− 'their (c)(i)' if a fraction < 1	
	6		
Alternative Mark Scheme for Q6 when the tens and units are reversed OR their sample space has less than 9 entries:			
6. (a) [11 12 13] 12 22 32 13 23 33 14 24 34 15 25 35 16 26 36	**B1**	**For all entries correct**	**IF their sample space has less than 9 entries, then 0 (a) B0 (b) 0 (c) 0**
(b) 0/18	**B2**	**B1 for 0 or impossible.**	
(c) (i) 9/18 I.S.W (ii) 9/18 I.S.W	**B1** **4**	**IF their (c)(ii) is 1 – their (c) i)**	
7. (a) (i) (B =) 4 (g)	B1		
(ii) e.g. 5, 5 on left pan and 3, 3 on right pan	B1	Any answer that makes B = 4. F.T. 'their B'	
(iii) e.g. 3, 3 on left with 5 on right pan	B1	Any answer that balances with the 1	
(b) (i) e.g. 7, 7 on left with 4 on right with the 10	B1	Any answer that balances with the 10	
(ii) e.g. 4, 4 on left and 7 with the 1	B1	Any answer that balances with the 1	
	5		
8. (a) 9	B1		
(b) (i) 84n (p)	B1	Ignore units	
(ii) x – 100 (m)	B1	Ignore units	
(c) 3x + 3y	B2	B1 for 3x + f(y) OR g(x) + 3y	
(d) 6x – 3 **(= 4x + 2)**	B1	Correct clearing bracket	F.T. until 2nd error
2x = 5	B1	Collecting terms correctly	
x = 2·5 OR 2½ OR 5/2	B1	F.T. ax = b (a≠1)	
	8		
9. Table: Probabilities total 1 from the 4 boxes	B1	Evidence for the 1st 3 marks may be elsewhere on the page	
White is 0.2	B1		
P(Y) = 0.3 and P(P) = 0.3	B1		
Spinner: R opposite W and Y opposite P	B1		
Given that P(Y) = P(P) and P(R) = P(W) and P(W)< P(Y) in the table, Y & P in <u>larger sectors</u> and R & W in <u>smaller sectors</u>	B1	**Must be** from entries in the table. No entries in the table, B0	
H2	5		

2011 Autumn UNIT 2 (Non calculator) Foundation Tier	Marks	FINAL POST CONFERENCE MARK SCHEME Comments (21/11/2011) (Page 3)
10.(a) Strategy for the idea of time difference, e.g. 16 hours different, 2 days + 8 ½ (from NY time on clock)	S1	For the idea of time difference, but there may be an error in the actual time difference Sight of 16.
Use of timeline or calculation, e.g. 15 00 + 16 hours, or 3pm + 9 hours to midnight + …., or 0630 + 48 hrs + 8 ½ hrs	M1	Sight of 31 or 56 ½ . Or M1 for an alternative complete method that could lead to a correct answer
Thursday **AND** 07(:)00 or 7 am	A1	Needs day and time, time (0700 or 7am) alone gets S1 M1 A0. Do not accept 700 or 7 as a time, but do not penalise again in QWC *An answer of '7(pm) Thurs' when S1 awarded gets M1 A0, but when S1 not awarded gets M0 A0.* *Penalise-1 for going from London to Sydney (leading to 2am Thursday)*
QWC: Candidates would be expected to • clearly show how they arrived at their solution • have few errors in spelling, punctuation and grammar • use capital letters appropriately	QWC 2	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar		QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. A final statement only, e.g. 'Thursday 0700' gets QWC0
(b) $\frac{600 \times 60}{1000}$ 36 (km/h)	M2 A1 8	M1 for intention to multiply by 60, or M1 for intention to divide by 1000 (may be shown by 0.6 km) CAO
11. (a) Method that produces at least 2 correct prime factors	M1	Before 2nd error
	A1	Ignore 1s seen
Sight of correct factors (2, 2, 2, 2, 7) $2^4 \times 7$	B1	FT their factors (with at least 1 index >1 used). Do not ignore 1s.
(b) E.g. '2^5 not even power' or 'no **whole** number times itself gives 32', '32 is in between 5^2 and 6^2'	E1	Accept no number times itself gives 32 **with** 5×5 **and** 6×6 given. Accept '$5\times5 = 25$ and $6\times6 = 36$'. Do not accept '25, 36'
H6cd	4	

UNIT 1 - HIGHER TIER

NOVEMBER 2011 UNIT 1 Higher	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 1)
1. (£) 24 × 1·2 OR (£)24 + 24 × 0·2 = (£)28.8(0) (£)28.8(0) ×¾ OR (£)28.8(0) – 28.8(0) ×¼ = (£)21.6(0)	M1 A1 M1 A1 4	F.T. their '24 + VAT' (Must be greater than 24). OR (£)24(.00) ×¾ OR (£)24.(00) – 24.(00) ×¼ M1 = (£)18.(00) A1 (£)18 × 1·2 OR (£)18 + 18 × 0·2 M1 F.T. 'their (£)18'. = (£)21.6(0) A1
2. Correctly drawn and labelled.	B4 4	'Correct' angles taken as given below (inclusive). Conservative 167° to 172°, Labour 141° to 145°, Liberal Democrats 29° to 34° and Others 14° to 18°. *(As total not a multiple or factor of 360 allow greater tolerance than the usual ± 2°.)* B3 for 4 correct angles drawn but not labelled correctly. B2 for 2 or 3 correct angles drawn and labelled. B1 for 1 correct angle drawn and labelled. <u>If no B marks gained</u>. M1 for sight of using a correct method to find an angle or percentage.
3. Three different valid comments. e.g. 'Not representative of whole school' 'Small sample' 'Might not get a truthful answer' 'Does not specify over what period of time', 'Might get a poor response' 'Use boxes to show times'.	B3 3	B1 for each different valid comment. Accept equivalent statements e.g. 'biased' (by age, gender or ability). 'not confidential' (a criticism of question (i)) 'is it per night or per week?' (a criticism of question (ii)) 'pupils will forget (to hand them in)' *Do not give more than one mark for similar criticism(s).*
4. (£)800 × 2·08 = 1664 (NZ dollars) 270 (NZ dollars on return) 270 ÷ 2·25 = (£)120 Look for • spelling • clarity of text explanations, • the use of notation (watch for the use of units being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	M1 A1 B1 M1 A1 QWC2 7	F.T. 'their 1664' – 1391 AND truncated. F.T. 'their return dollars' even if not multiple of 10. QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar.

NOVEMBER 2011 UNIT 1 Higher	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 2)
5. B C A	B1 B1 B1 3	
6. Showing a strategy to find total 'running time' and total 'walking time' OR use of km/min. Runs for 50min AND Walks for 10min. Use of Distance = Time × Speed Runs $18 \times 50/60$ (= 15km) Walks $6 \times 10/60$ (= 1km) (Distance =) 16 (km)	S1 B1 M1 m1 m1 A1 6	E.g. 'Running time' + 'walking time' = 60 minutes. OR 'Ten repeats of 5min running and 1min walking' is enough for S1B1 Allow this M1 even if time in minutes and speed per hr. F.T. their 'running time' if less than 60minutes. F.T. their 'walking time' if less than 60minutes and not equal to 'running time'.
7. $\frac{23970 - 23500}{23500} \times 100 = 2(\%)$	M1 m1 A1 3	*Look out for those who incorrectly use 23970 as a denominator (giving an answer of 1·96....%) which is then approximated to 2%. M0m0A0.*
8. $\pi \times 50 + 100 = 257(\cdot 07...)$ (nearest 10 metres =) 260	M1 M1 A1 B1 4	*(Note for '+100' and not '100'.)* F.T. for A1 and B1 only if at least one M1gained and lengths are dimensionally correct and π used. F.T. for equivalent work to nearest 10 metres. SC2 for 130. SC1 for 128·5(..0) [Using 50m as diameter]
9. (a) $15 \times \frac{1200}{800} \times \frac{6}{5} = 27$ (people) (b) $800 \div (15 \times 6)$ OR $1200 \div (27 \times 5)$ (which is less than 10) so 'NO'. *A correct conclusion must be unambiguously stated or implied.*	M1 M1 A1 B1 4	Or equivalent e.g. × 1·5 or ÷ 0·66(6...). Or equivalent e.g. × 1·2 or ÷ 0·83(3...). C.A.O. *Alternate presentation.* *Scarves* *Time* *People* *800* *6* *15* .... Award M1 for one correct step .... Award M1 for next correct steps .... *1200* *5* ***27*** A1 C.A.O. (Watch out for compensating errors) FT their 27 Also $15 \times 6 \times 10$ (required) (which is more than 800) . OR $27 \times 5 \times 10$ (required) (which is more than 1200).
10. (a) $(60/4) \times 60 \times 60 \div 1000 = 54$(km/h) (b) Recognising that time could be 4·5(seconds) $\frac{60 \times 3600}{4 \cdot 5 \times 1000} = 48$(km/h)	M1 M1 A1 B1 M1 A1 6	For converting 'per second' to 'per hour'. For converting metres to kilometres. C.A.O. F.T. their 'time' only if greater than 4(seconds). A0 if greater than 50(km/h) on F.T.

NOVEMBER 2011 UNIT 1 Higher	Mark	FINAL MARK SCHEME (19/11/11) Comments (Page 3)
11. 2116 equivalent to 92(%) implied. $\frac{2116 \times 100}{92}$ = 2300(kg)	S1 M1 A1 3	Allow 2116 = 92(%) Or equivalent.
12. Realising that 24 cards must be considered in solution. (Expected length =) 24 × 8 + 10 = 202(cm) (Maximum 'error' =) 24 × 0·1 (= 2·4) (Least length =) 199·6 AND (Greatest length =) 204·4	B1 M1 A1 M1 A1 5	Any use of 24 e.g. 24 × 8 or 24 × 0·1 or 24 × 1. C.A.O. Accept 24mm only if units given. C.A.O. *Alternate method* 24 overlaps B1 Least length = 250 – 24 × 2·1 M1 = 199·6(cm) A1 C.A.O. Greatest length = 250 – 24 × 1·9 M1 = 204·4(cm) A1 C.A.O. *If no marks gained, then SC2 for 197·5 and 202·5.* *SC1 for either 197·5 or 202·5.*
13. Sight of ¼ × π × 8^2 OR ½ × 8^2 (Area segment =) ¼ × π × 8^2 – ½ × 8^2 = 18·2(65..)(cm^2)	B1 M1 A1 3	Implied by 50·2.... and 32 or ½ × 8 × 8 × Sin $90^{(°)}$ C.A.O. Accept 18·2 to 18·3 inclusive.
14. (Volume of hemisphere. =) ⅔ × π × 9^3 ('Height' of cone =) 15(cm) (Volume of shape =) ⅔ × π × 9^3 + ⅓ × π × 9^2 × 15 = 2799(·15..) (cm^3) (Volume of pyramid =) ⅓ × 60^2 × 120 (Height of 'small' pyramid =) 90(cm) (Volume of shape =) ⅓ × 60^2 × 120 – ⅓ × 45^2 × 90 = 83250 (cm^3) (Number for re-cycling =) $\frac{50000 \times 2799}{83250}$ = 1682	B1 B1 M1 A1 B1 B1 M1 A1 M1 A1 10	Look for sight of 1526·8(...) for this B1. Both B marks may be implied from volume calculations. F.T. 'their hemisphere volume' and 'their cone height'. *(The formula ⅓ × π × 9^2 × 'their height' must be used for the M1 to be awarded)* Allow 2797 to2801. *(Look out for those who multiply by 50000 at this stage)* Look for sight of 144000 for this B1. Both B marks may be implied from volume calculations. F.T. 'their pyramid volume' and 'their height for the small pyramid'. *(The formula ⅓× 45^2 × 'their height' must be used for the M1 to be awarded)* F.T. their two calculated volumes. *(The 50000 might have already been considered.)* Must be given to the nearest whole number above.

UNIT 2 - HIGHER FOUNDATION

Unitised Unit 2 Nov 2011 Higher Tier Markscheme		Final 29/11/11
1. (17, 18) in answer space or annotated on the diagram.	B2 2	B1 for either OR correct parallelogram shown OR the point (17,18) marked unambiguously on the grid
2. Table: Probabilities total 1 from the 4 boxes White is 0.2 P(Y) = 0.3 and P(P) = 0.3 Spinner: R opposite W and Y opposite P Given that P(Y) = P(P) and P(R) = P(W) and P(W)< P(Y) in the table, Y & P in <u>larger sectors</u> and R & W in <u>smaller sectors</u>	B1 B1 B1 B1 B1 5	Evidence for the 1st 3 marks may be elsewhere on the page **Must be** from entries in the table. No entries in the table, B0
3.(a) Correct reflection (b) Correct translation	B2 B1 3	B1 Any horizontal reflection or a reflection in x=4, OR line y=4 seen
4.(a) Strategy for the idea of time difference, e.g. 16 hours different, 2 days + 8 ½ (from NY time on clock) Use of timeline or calculation, e.g. 15 00 + 16 hours, or 3pm + 9 hours to midnight + …., or 0630 + 48 hrs + 8 ½ hrs Thursday **AND** 07(:)00 or 7 am QWC: Candidates would be expected to • clearly show how they arrived at their solution • have few errors in spelling, punctuation and grammar • use capital letters appropriately QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer (b) $\frac{600 \times 60}{1000}$ 36 (km/h)	S1 M1 A1 QWC 2

6.(a) 5 (b) 4 (c) Method that produces at least 2 correct prime factors Sight of correct factors (2, 2, 2, 2, 7) $2^4 \times 7$ (d) E.g. '2^5 not even power' or 'no **whole** number times itself gives 32', '32 is in between 5^2 and 6^2'	B1 B1 M1 A1 B1 E1 6	Accept embedded answer $\sqrt[3]{5\times5\times5}$. Mark final answer. CAO. Do not accept 4/1 Before 2nd error Ignore 1s seen FT their factors (with at least 1 index >1 used). Do not ignore 1s. Accept no number times itself gives 32 **with** 5×5 **and** 6×6 given. Accept '$5\times5 = 25$ and $6\times6 = 36$'. Do not accept '25, 36'
7.(a) $4n + 7$ (b) 63, 62 (c) Strategy, e.g. 1×3, 2×4, 3×5, OR (3, 8,) 15, 24 with an attempt to look at differences, OR n^2 $n \times (n \ldots.)$ OR second difference of 2 OR $n^2 \pm \ldots$ $n\times (n + 2)$ OR $n^2 + 2n$	B2 B1 S1 M1 A1 6	B1 for $4n \pm ..$, B0 for $4n$ alone, B0 for n+4. Allow B2 for n=4n+7 Looking at the number of squares with differences If M1 awarded then also award S1
8.Three reasonable sketches	B3 3	B1 for each sketch. N.B. The 2nd needs to show two disjoint curves, 1st&3rd intention to pass through *O*.
9.Any 3 of the lines $y = 5$, $x + y = 4$, $x = 3$, $x + y = 0$ drawn Correct region indicated	B3 B1 4	Award B2 for any 2 lines OR B1 for any 1 line drawn CAO
10. Method to find the first variable Correct first variable Method to find the second variable Correct second variable	M1 A1 M1 A1 4	Allow 1 slip, but not in the equal coefficient $x = 8$ or $y = -3$ FT from their first variable
11. Transformation horizontally to the right 9 indicated correctly on the x-axis with the correct transformation	B1 B1 2	 SC1 for left shift with 3 indicated on the x-axis
12. (a) CQ or QC Tangents equal in length (b) 110° Angle centre twice angle circumference **AND** cyclic quadrilateral	 B1 E1 B1 E1 4	E marks depend on B marks being awarded Or equivalent description in words OR angles at a point (or centre) **AND** angle centre twice angle circumference
13.(a) Attempt to subtract $100x = 76.464\ldots$ and $x = 0.76464\ldots$ 757/990 (b) $25 - 15\sqrt{2} - 15\sqrt{2} + 18$ $= 43 - 30\sqrt{2}$ Irrational	M1 A1 M1 A1 B1 5	Or equivalent for $1000x - 10x$ Final answer of 75.7/99 M1 only With at least 3 of the terms correct OR $25 \pm a\sqrt{2} + 18$ with $a \neq 0$ CAO FT provided at least M1 awarded
14. (a) $50/100 \times 50/99$ (= 2500/9900) $50/100 \times 50/99 + 50/100 \times 50/99$ 5000/9900 (=50/99) (b) 1 – P(odd, odd) $= 1 - 50/100 \times 49/99$ = 7450/9900 (=149/198)	B1 M1 A1 M1 M1 A1 6	 OR $2\times 50/100 \times 50/99$ Ignore incorrect cancelling *FT from (a) if P(OE) and P(EO) and P(OO) used* OR P(OE) + P(EO) + P(EE) OR FT (a) + P(EE) $50/100\times50/99+50/100\times50/99+50/100\times49/99$ OR (a) + $50/100\times49/99$ CAO. Ignore incorrect cancelling

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