

GCSE MARKING SCHEME

MATHEMATICS - WALES PILOT

SUMMER 2011

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2011 examination in GCSE MATHEMATICS - WALES PILOT. 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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GCSE MATHEMATICS - WALES PILOT

PAPER 1 - FOUNDATION TIER

2011 Summer Paper 1 (Non calculator) Wales Pilot Foundation Tier	Marks	Comments
1. (a) (i) 35602	B1	C.A.O.
(ii) seventeen thousand and twenty five	B1	C.A.O.
(b) (i) 15 and 65	B1	CAO
(i) 53 and 85	B1	$C \land O$
(ii) 55 and 65 (iii) 54	DI DI	$C \land O$
(iii) 54	DI DI	$C \land O$
(1v) +9	DI	C.A.O.
(c) 1, 5, 7, 35 Ignore repeated factors	B2	B1 for any 2 or 3 factors and no incorrect numbers. OR the 4 correct factors and 1 incorrect number
(d) 40/8.99 OR 40/9	M1	Allow M1 for sight of $40/8.99$ OR $8.99 + 8.99 + 8.99 + 8.99$ = 35.96 OR $40 - 8.99 - 8.99 - 8.99 - 8.99 = 4.04$
= 4	A1	C.A.O.
	10	
2. (a) (i) $40(\%)$	B1	C.A.O.
(ii) 60	B1	F.T. 100 – 'their (i)
	DI	
(b) (i) (0) 25	BI	C.A.O.
$(11) (0) \cdot 24$	BI	
(iii) 24% (OR \cdot 24) (0) 25 (OR $\frac{1}{4}$) 3/10	BI 5	F.T. their values from (1) and (11).
3 km	B1	САО
l(itre)	B1	C = A O
m^2	B1	$C \land O$
$\alpha(rams)$	B1	$C \land O$
g(rams)		C.A.O.
$\frac{1}{4}$ (a) (i) 32	R1	$C \land O$
$(i) \frac{1}{52}$	B1	$C \land O$
(11) 10	DI	0.11.0.
(b) (i) Add 6 to the previous term	B1	
(ii) Divide the previous term by 3	B1	
()	4	
5. (a) likely	B1	C.A.O.
unlikely	B1	C.A.O.
impossible	B1	CAO
imposition	DI	
(b) (i) 16	B1	C.A.O.
(ii) 11	B1	C.A.O.
$\cap \cap \cap$		
	B1	C.A.O.
(ini) 22 7	M	
(IV) 22 - 7 = 15		
= 15		
(a) (b) (b) (b) (b) (b)	0 D1	Allow +2°
$\begin{bmatrix} 0. & (a) & (1) & 122 \\ (ii) & Angle at A between 26 & 20 inclusive$	DI D1	Allow ±2 Use Overlay
(1) Angle at A between 20 – 50 metusive	DI	Use Overlay
(b) 2 rectangles of 7 by 3	R1	Use overlav
1 rectangle of 7 by 2	R1	0.50 Overlay
2 rectangles of 2 by 3		
A rectangles of 2 by 5 Makes a correct net	D1 D1	
Wakes a confect net	6	
	0	

2011 Summer Paper 1 (Non calculator) Wales Pilot Foundation Tier	Marks	Comments
7 (a) Missing side = 3	R1	
Perimeter = 42 (cm)	B1 B1	F.T. 39 + 'their 3'
(b) Area = 10×4	M1	For the area of 1 rectangle
$\times 2 = 80$	A1	Watch out for 10×4 then $\times 3$ which gets M0.
cm ²	U1	Independent of all other marks
	5	
8. (a) Plots	P1	Allow 55-60, 140-145, 195-200 inclusive (small square).
		Allow vertical line graphs, but bars get P0.
Line(s) or curve	B1	This mark is for connecting the points to allow interpolation. At least as long as fluid ounces from 2 to 7.
(b) Any correct strategy, e.g. 3 times value at 10 fluid	M1	Any correct method using graph or table.
Their answer	A1	F.T. their graph.
		Unsupported answers in the range 825 – 875 get M1. A1.
	4	
9. (a) 8x	B1	C.A.O.
(b) $(x =) 4$	B1	Allow embedded answers such as $7 \times 4 = 28$
(a) $25 - 5 \times 4 + 2H$	D1	Correct substitution $25 - 54 + 24$ gate P0
(0) 55 - 5 + 4 + 5H 3H = 15	B1 B1	Context substitution. $55 - 54 + 5H$ gets B0. Isolating the H
H = 15/3 ISW (=5)	B1	F T $_{a}H = h (a \neq 1)$
11 15/5 15 W (5)	DI	Allow embedded answers
	5	
10. Man 5 to 7 ft OR 1.5 to 2.5 metres	B1	Unsupported answers marked as
Man 1cm Whale = 15cm		fallaura.
Multiplying factor $= 15$	B1	feet 50 SC1 1 M1. A1 (inc) 105 126
Length = man's estimate \times their SF (10-18)	M1	
		metres 15 22.5 37.5 45
SCI for answers which:	A 1	ET their men's brickt estimate AND costs factors 10, 19
(a) only give mail's neight as rem and length of whate as	AI	r.1. then man's height estimate AND scale factors 10 – 18
(b) a proper attempt at 'dividing' the length of the whale		For this A1 we need correct units (feet or metres) either
into equal parts		explicitly shown or implied by their figures.
	4	r rijeta i radjit gada
11. (a) (i) 10	B1	
(ii) e.g. 4 (4-rods) with 3 (3-rods) 3 above/below	B1	
them $(16 - 9)$		
(iii) e.g. a (3-rod) and a (4-rod) $(4-3)$	B1	
(b) (i) $e = 3$ (5-rod) with 2 (7-rode) (15 7)	R1	
(i) (i) e.g. $3(5-100)$ with $2(7-1003)$ (15 - 7) (ii) $3(7 \text{ rods}) = 4(5 \text{ rods})(21 - 20)$	R1	
(1) 5 (71003) + (51003) (21 20)	5	
12. Q	B3	B2 for any 2 or 3 correct
Ŝ		B1 for any 1 correct
Р		Allow correct names or diagrams.
R		
	3	
$13. 11,890 \sim 12000 39 \sim 40 5.96 \sim 6 52 \sim 50$	B2	B1 for any 2 estimates.
		Use of 12 and 4 is accentable as the estimate for 52
		see of 12 and 1 is deceptuble as the estimate for 52
12000/40 = (300 galls)	M1	Division of 'their 12000' by 'their 40'
$300 \times 6 = (\pounds 1800)$	M1	Multiplication by 'their 6'
1800/50	M1	Division by 'their 50'
=£36	A1	F.T. their estimates
	-	Unsupported (t) 36 gets the final 4 marks only.
	0	

2011 Summer Paper 1 (Non calculator)	Marks	Com	ments
Wales Pilot Foundation Tier		~	Γ
14. (a) 9 15	B2	C.A.O.	
6 12		B1 for any 2 correct entries	
(b) $\frac{6}{2}$	B2	F T their table	NOTES
$(0) \frac{16}{16}$		B1 for a numerator of 6 in a	Penalise -1 for use of words
		fraction less than 1	such as "6 out of 16", "6 in
		B1 for a denominator of 16 in	16" OR "6:16".
		a fraction < 1	When fraction and wrong
6			notation seen, DO NOT
(c) $\frac{1}{16}$ of 160	MI	F.T. 'their (b)' if a fraction	penalise wrong notation.
10	. 1	$ < (\neq \frac{1}{2})$	
= 60	AI	60/160 gets M1, A0	
		60 out of 160 gets M1, A1	
(d) $160 \times 50(p) - 60 \times (\pounds)1$ OR $(\pounds)80 - (\pounds)60$	M1	Full method	
$= \pounds 20.00$	A1	F.T. 'their 60'	
	8		
15. (a) 200	B2	B1 for 8 OR 25	
(b) 5 2	M1	Any correct method	
$(0) \frac{1}{8} - \frac{1}{8}$	1411	Any concer method	
3	A1	Accept .375 OR 37.5 %	
$=\frac{1}{8}$			
8			
(c) 3	B1	Do not accept 3^3	
	5	- · ···· ···· ····	
16.(a) 170 (cm)	B1		
(b) 50 (kg)	B1		
(c) Positive	B1	Do not accept a description	
(d) Suitable line, with some points above and below	B1	No requirement to pass through the	e means
(e) F.T. their line of best fit.	B1	Accept answers in the range >55 (1)	kg) but ≤ 62 (kg)
H2	5		
17. Correct region shaded, both sides of AB	B3	Mark intention. B1 for line B1	for arc, B1 for shading.
		FT similar region, arc centre A	and a line crossing AB for the
Н6	3	final B1.	e e e
18. 18	B2	B1 for sight of 6 and 3	
H8ai	2		
19.(a) $8x + 12 + 9x - 24$	B1	FT until second error	
= 1/X - 12	BI		
b) $y^4 + 7y$	D	P1 for each term as part of a 2	torm ovpression
	D2	Do not accept $y > y^3$	term expression.
		A coept $(+y \times 7)$ or $(+7 \times y)$ or $(y \times 7)$	7
		$\begin{bmatrix} A & C & C \\ C & C & C \\ C & C & C \\ C & C &$	
c) $x + 7 \times 3 = 12 \times 3$ OR $x/3 = 12 - 7$	N/1	Accent embedded enswer	
x = 15	Λ 1	FT until 2 nd error	
	AI		
(d) $2y + 5 = 45/3$ OR $6y + 15 = 45$	B1	Accept $y = 30/6$ or $10/2$ ISW	Accept embedded answer
y = 5	B1		reept on our and wor.
H /	8		

PAPER 2 - FOUNDATION TIER

2011 Summer Paper 2 (Calculator allowed) Wales Pilot Foundation Tion	Marks	Comments
1 (a) (48.62)		
35.97	B1	САО
21.96	B1	C.A.O.
3.35	B1	C.A.O.
109.9(0)	B1	F.T. their figures for one error
(b) (i) (£) 10.99	B1	F.T. from (a). Award B1 for sight of (£)10.99 in (ii).
(ii) $\text{Cost} = (\text{\pounds}) \ 109.90 - 10.99$	M1	
= (£) 98.91	A1 7	F.T. their 10%
2. (a) Evidence of square counting	/ M1	e.g. dots in the squares
53-57	A1	
$530 - 570 (m^2)$	B1	F.T. their area $\times 10$
(b) diameter	B1	C.A.O.
tangent	B1	C.A.O.
(c) parallelogram	B1	C.A.O.
trapezium	B1	C.A.O.
cone	B1	C.A.O.
	8	
3. (a) 14, 15, 5, 6	B2	BI for any two/three correct frequencies If frequencies score 0, then give B1 for all 4 correct tallies
(b) I (abour)	D 1	E T their table of frequencies
(b) L(abour)	DI	Allow I (abour) and 15, but P0 for 15 only
		Allow E(abour) and 15, but Bo for 15 only
(c) C, L, D, P	B1	F.T. their table of frequencies
Uniform scale starting at 0	B1	If no scale then B0,
Four bars at correct heights	B2	Allow one square to represent 1
		B1 for any 2 correct bars on F.T.
	7	
4. (a) $\text{Cost} = 33 \times 9.5(0) + 150$	M1	For correct substitution
= (£) 463.5(0)	A1	C.A.O.
(b) Number of students $x = 0.50 = (272 - 125)$	MI	For correct substitution and subtraction
(b) Number of students $\times 9.50 = (3/2 - 125)$		A llow embedded references to the correct ensurer
Number of students = 26		Allow embedded references to the correct answer.
5 (a) 1 line of symmetry	- 4 	
(b) 1 line of symmetry	B1	
(c) 2 lines of symmetry	B2	Allow B1 for any 1 line of symmetry and no incorrect lines
(c) 2 miles of symmetry	02	OR for 2 lines of symmetry and 1 incorrect line
	4	
6. (a) П П П П	B1	
	D1	
(b) 5, 12, 8	BI	
(c) 11	B1	
(d) Stage 5	R1	OR for 6 in (i) or for 10 in (ii)
(i) 6	R1	F T 'their stage' $+ 1$
(i) 0 (ii) 10	R1	F T 'their stage' \times 2
(1) 10	6	
7. (a) -6 (°C)	B1	C.A.O.
(b) 5 (°C)	B1	Accept –5
(c) 24 (°C)	B1	Accept –24
	3	

2011 Summer Paper 2 (Calculator allowed) Wales Pilot Foundation Tier	Marks	Comments
\mathcal{R} (a) Sum of the numbers (506)	M1	For attempt to add the numbers
$\begin{array}{c} \text{Sum} \\ \text{Sum} \\ \end{array}$	IVI I m 1	For dividing a number in the range 410 500 inc. by 9
		For dividing a number in the range $410 - 390$ mc. by 8
63.25	AI	C.A.O.
(b) 39	B1	C.A.O.
(c) 42 53 58 <u>59 65</u> 73 75 81	M1	For ordering (ascending or descending) all 8 numbers OR for
		unsupported 59, 65 OR 65, 59
62	A1	C.A.O.
	6	
9. A at $(-2, -3)$	B1	C.A.O, Reverse coordinates gets 0.
B at $(-3, 2)$	B1	C.A.O, Allow plots within a 2mm square inclusive.
C at $(3, -4)$	B1	C.A.O, Accept the letters A,B, C instead of points
	3	
10. (a) $36 \times (\text{f})158$	M1	
100		
$=({\tt f})56.88$	A1	C.A.O. Penalise -1 for extra work such as adding £158 to get (£) 214.88
(b) $(\pounds)48.24 - (\pounds)16.99$ OR 31.25 (\pounds)6.25 6.25	M1	For the complete method
= 5	A1	C.A.O.
Number of days hired $= 6$	A1	F.T. 'their $5' + 1$ if M awarded.
		Unsupported 6 gets all 3 marks. Unsupported 5 gets 0
	5	
11. 3 or 4 angles correct and correctly labelled.	B4	Use the overlay and allow $\pm 2^{\circ}$.
		Correct labels (numbers NOT the frequency OR angle).
		3 correct labels is enough.
3 or 4 angles correct, labels not fully correct.	B3	Accept labels in the form of a key.
2 angles correct and correctly labelled.	B3	
2 angles correct, labels not fully correct.	B2	
1 angle correct and correctly labelled.	B1	
		If B0 scored for the diagram, check the angles and the method
OR		to see if the M1 and the A1 can be awarded.
		1 is 4° gets the M1.
If 0 OR 1 for their diagram or no diagram,	M1	If only B1 is scored for the diagram, and all the angles given
360/90		correctly, then cancel the B1 and award M1. A1 for 2 marks.
Angles are 20, 168, 132 and 40	A1	OR SC1 for all percentages: 5.5, 46.7, 36.7, 11.1 rounded
8		OR truncated
	4	
12. (a) 3	B1	C.A.O.
(b) $09.55 - 04.45$	M1	For the two correct times subtracted
= 5 hours 10 minutes	A1	C A O
(c) 11:55	B1	CAO
15:20 11:55	M1	OR F.T. 12:05 (B0) then M1 for $15:20 - 12:05$ and A1 for
-3 hours 25 minutes	A1	3 hours 15 minutes
- 5 hours 25 minutes	211	5 hours 15 minutes.
(1) The 07:00 from Second	E2	E1 for identifying the correct hus
(d) The 07.00 from Navmart to Hasthrow is 4 hours	1.12	If correct hus identified then a further E1 for a good
and the others are shout 2 hours		avalanation which is less detailed a g theory is it takes
and the others are about 5 nours	Q	longer'
12 (a) Waltime = $12\sqrt{7}\sqrt{11}$	0 N 1	
15. (a) volume = $12 \times 1 \times 11$	MI	CAO
$= 924 (cm^{2})$	AI	
		Allow M1, AU for an answer made up of the digits, e.g 9.24 or
	1.61	9240
(b) Height = $924/(6 \times 13)$	MI	
= 11.8 (cm)	Al	F.1. their 924
	4	

2011 Summer Paper 2 (Calculator allowed)	Marks	Comments
Wales Pilot Foundation Tier		
14. <u>Parallel to the 13m side</u>		
Setting up the model (Needing 3 strips along 8m)	S 1	For the strategy and finding the need for 3 strips of carpet
$Cost = 13 \times 3$	M1	Finding the area of the carpet for their model
× (£) 25	m1	Finding the cost of the carpet for their model
= (£) 975	A1	F.T. the area of their carpet \times (£) 25
Parallel to the 8m side		
Setting up the model (Needing 5 strips along 13m)	S 1	For the strategy and finding the need for 5 strips of carnet
$Cost = 8 \times 5$	M1	Finding the area of the carnet for their model
$\cos t = 0 \times 5$	1011	Finding the asst of the carpet for their model
(1) 23	A 1	Finding the cost of the carpet for their model ΣT the area of their correct $\chi(f)$ 25
= (t) 1000	AI	F.1. the area of their carpet \times (£) 25
		Use the 4 for either model and 3 for the other
First method is cheaper by (£) 25	Al	F.T. for finding second cost AND stating which is the cheaper,
		provided at least S1 awarded.
	8	
15. Ship from A travels 120km	B1	OR implied by their drawing of an arc 12cm centred at A.
Ship from B travels 80km	B1	Or implied by their drawing of an arc 8cm centred at B.
Arc of a circle centre A radius 12cm AND	B2	B1 only for either arc if they do not meet.
arc of a circle centre B radius 8cm meeting at the 2		Allow 11.8 – 12.2 F.T. their distance \div 10
correct points		Allow 78 – 82 FT their distance \div 10
<u>correct points.</u>		P1 is awarded for the correct position of either point
		Bi is awarded for the correct position of either point
		where the ships meet being clearly & unambiguously
~		<u>marked even if no arcs are drawn.</u>
Cannot meet at the left hand intersection because	E1	
the ship from A cannot cross land.		
Bearing from their chosen point.	B1	If due to error(s) candidates end up with 2 possible points of
(Must be in 3 figure form)		meeting then B1 for finding BOTH bearings from position of
$012^{\circ} - 016^{\circ}$ for correct point		their points where the shins meet
		aren pointo where the sinps meet.
	6	
16(2), 70/1.66	0 1	
10. (a) / 0 / 1.00		64.0
(t) 42.17	AI	CAU
46.35 / 1.09	MI	
(£) 42.52	Al	Penalise inappropriate rounding, or not rounding once only
		<i>Treat reverse of exchange leading to answers of 27.92 and</i>
		64.22 as SC2
(b) E.g. Buy Italy because more expensive, (but only a	E1	FT provided M2 awarded in (i)
little) but he can have it straight away OR		Ignore incorrect calculation of the difference in price
Buy Switzerland to save (a little) money		-8 F
H2b	5	
$\frac{1}{17}$ (a) $3n + 4$	BJ	Blfor $3 \times n$ seen (not $n+3$) or "term in n " ± 4
(b) $5n - m \pm 22$ OD $m \pm 22 - 5n$	D2 D1	5 n alone on one side of an equation
$(0) 3\Pi - \Pi + 32 = 0$ $\Pi + 32 - 3\Pi$	DI	sh alone on one side of all equation
$n = \frac{m + 32}{m}$	B1	F.T. until 2^{nd} error. B0 for $m+32/5$ $m+32\div5$
5		
(c) Strategy, e.g. attempt to use algebra for the terms	S 1	
or trial from a starting number keeping to difference		
criteria		
a, a+7, a+14, a+21 or equivalent	N/1	OP sight of at least 3 trials keeping to 1 oritorian
4a+42 = 6 OR 4a = -36		ON Signt of at least 5 that's keeping to 1 childholl
-92. 5. 12	AI	
H5ac	BI	OK B4 for signt of the correct terms -9, -2, 5, 12
	8	
18. Area trapezium = $\frac{1}{2}(6+8) \times 5$	M1	
$35 (cm^2)$	A1	Maybe implied in later working
Triangle: $\frac{1}{2} \times 10 \times x = 35$	M1	FT their area of a trapezium
x = 7 (cm)	A1	Watch for a correct answer from incorrect working leaving out
		^{1/2} from both formulae this gets SC1
H4a	4	
6		

PAPER 1 - HIGHER TIER

2011 Summer Paper 1 Wales Pilot Higher Tier	Mark	Comments
1.(a) Sight of any two from: 80 and 400 and 1200 or 1000	M1	Maybe implied if correct response is given.
240 or 200	A1	For correct evaluation of their simple calculation
(b) 790 (c) (45/150)×100	B1 M1	This complete method maybe seen in stages
30 (%)	A1	
(d) Attempt common format of any 3 of the given values with at least 2 of their manipulations correct	MI	All decimals, common denominator or %
All 4 correct in the same format, e.g. 14/40, 15/40, 12/40 with 16/40 (or equivalent)	A1	Or 0.35, 0.375, 0.3 with 0.4, OR 35(%), 37.5(%), 30(%) with 40(%)
3/8 or its equivalent	A1	FT provided M1 awarded. Accept 3/8 provided M1 awarded Accept where candidates decide to find fractions of their own
	8	chosen quantity
2.(a) 170 (cm)	B1	
(b) 50 (kg) (c) Positive	BI B1	Do not accent a description
(d) Suitable straight line, with some points above and below	B1	No requirement to pass through the means
(e) Follow through their line of best fit	B1	Accept answers in the range >55 (kg) but ≤ 62 (kg)
$\frac{2}{2}$ (a) (i) $\frac{9}{2}$ 5	5 D1	Accord $0 \times x$, 5 or $\times 0$ 5. Mark final answer $0 \times (x, 5)$ is D0
3.(a) (i) $6x - 3(ii) (y+5)/8$	B1 B2	B1 for sight of $y+5$ or $(y-5)/8$ or $y+5/8$ or $y/8+5$
		Mark their final answer if B2 is awarded
(b) -5, -2, 3	B2 5	B1 for any two terms correct in the correct position SC1 for -6, -5, -2
4. Perimeter 8+ 13 + 8 + 13 or equivalent	M1	E.g. drawing an outer rectangle with measurements shown or
= 42 (m)	A1	Accept 42cm
	2	
$5.(a) a = 40^{\circ}$ 180 - 85 - 40	M1	FT their a $b=95 - a$
$b = 55^{\circ}$	A1	
(b) 360/8	M1	Or alternative complete method
$= 45(^{\circ})$	A1	If marked on the diagram needs to be for c
(c) Correct reflection (in the line $x=2$)	B2	BI for a reflection in any vertical line, or BI for drawing $y = 2$ or B1 for reflection in $y=2$ with (out) line shown
(d) Correct translation	B2	X = 2, or B1 for reflection in $y=2$ with (out) line shown. B1 for translation 4 left or 6 down, or correct translation for 3
	9	vertices not joined, or for translation in the appropriate direction but with consistent misread of the scale
6. Correct region shaded, both sides of AB	B3	Mark intention. B1 for line, B1 for arc, B1 for shading.
	3	FT similar region, arc centre A and a line crossing AB for the final B1
7.(a) $8x + 12 + 9x - 24$	B1	FT until second error
= 17x - 12	B1	Mark final answer
(b) $y^4 + 7y$	B2	B1 for each term as part of a 2 term expression.
		Do not accept yxy'. Accept $(+x \times 7)$ or $(+7 \times x)$ or $(+x \times 7)$
(c) $x + 7 \times 3 = 12 \times 3$ OR $x/3 = 12 - 7$	M1	Accept embedded answer
x = 15	A1	FT until 2 nd error
(d) $2y + 5 = 45/3$ OR $6y + 15 = 45$	B1	
y = 5	81 8	Accept $y = 30/6$ or $10/2$ ISW. Accept embedded answer
8.(a)(i) 18	B2	B1 for Sight of 6 and 3
(ii) $1/6 \times 1/6$	M1	
= 1/36	A1 D2	
(b)(1) Tree completed correctly (ii) $1/6 \times 5/6$ OP $5/6 \times 1/6$	B2 B1	BI for the first throw correct OR all of the second throw correct Evidence of $P(\text{not six}) = 5/6$
$1/6 \times 5/6 + 5/6 \times 1/6 \text{ OR } 2(5/6 \times 1/6)$	M1	FT their tree, provided probabilities are <1
= 10/36 ISW	A1	
9 (a) -22 and 14	9 B2	B1 for each correct entry
(b) Plots correct, allowing one error or omission	B1	FT from (a) . Allow plot within the correct small square
(At least 6 correct plots) All 7 correct plots joined with a curve	C1	
(c) $y = 60$ seen or implied	M1	FT their graph
From their graph (about 2.3)	A1	FT their graph
	6	

2011 Summer Paper 1 Wales Pilot Higher Tion	Mark	Comments
Wates Fliot Higher Tier 10 (a)(i) Method with least 2 correct prime factors	M1	Must be before 2 nd error
Sight of correct factors (2, 2, 2, 2, 2, 2, 2)		Ignoro 1s seen
$2^2 \times 2^4$ or $2^2 \times 2^4$	D1	ET their factors with at least on index >1 used. Do not ignore 1s
	DI	FT where possible from their (i) $T = 100000000000000000000000000000000000$
(ii) NO stated or implied with valid explanation	E2	F1 for $2^3 \times 3^4$ but no explanation or conclusion
e g "No. 2 has an odd power"	152	E1 for 2×3^{-5} but no explanation of conclusion. E2 for "the power of 2 is odd" without statement of NO
$^{\circ}$ 2 x 324 which is a perfect square'		E2 for the power of 2 is odd without statement of ito.
'Because $25^2 = 625$ and $26^2 = 676$ '		Answer 'NO' alone is F0
Decause 25 025 and 20 070		F1 if one of 25^2 or 26^2 incorrectly evaluated
		E1 for $25^2 = 625$ and $26^2 = 676$ ' ('no' not implied)
(b)(i) $20x^9v^7$	B2	Accept " \times " included B1 for $x^9 v^7$ or 20 v^7 or 20x ⁹
(ii) $5a^3/b^2$ OR $5a^3b^{-2}$	B2	B1 for a^{3}/b^{2} or $a^{3}b^{-2}$ or $5a^{-2}b^{-2}$ or $5a^{-2}/b^{2}b^{-2}$ or $5a^{-3}$
	9	
11.(a) $x/15 = 7/21$ OR $x = 15/(21/7)$ OR $x = 15/3$	M1	Or other suitable method, e.g. use of scale factor 3
x = 5 (cm)	A1	
$v/4.2 = 21/7$ OR $v = (21/7) \times 4.2$	M1	
y = 12.6 (cm)	A1	
(b) Area scale factor 4^2 or 16	B1	
3.5×16	M1	FT for M1 only incorrect evaluation of 4^2
$56 (\mathrm{cm}^2)$	A1	CAO
	7	
12. E D C A B	B4	B1 for any one correct OR
	4	B2 for any two correct OR B3 any three or four correct
13.(a) 38(°)	B1	The E1 mark depends on the B1 mark
Radius meets tangent at a right angle	E1	1
(b) 52(°)	B1	
Alternate segment theorem	F1	
(a) 58(0)	B1	
(Lassocias triangle) angle at contra truice angle at		Do not accort calculation shown Accort approximations
(isosceles triangle,) angle at centre twice angle at		Do not accept calculation shown. Accept abbreviations
	0 D2	Or alternatives
14. Any 3 of the lines $y=x/2+4$, $x+y+6=0$, $y=4$ and $x=3$	B3	Award B2 for any 2 lines OK B1 for any 1 line drawn or indicated
Correct region indicated		CAU
(15(2)(2x+5)(4x-2))	4 B2	B1 for $(3x - 5)(4x - 3)$ or split mid term and 1 st step factor
-5/3 and $3/4$	B1	E T for pair of brackets
(b) $(7y-10)(7y+10)$	B2	B1 for $(7y = 10)(7y = 10)$
$(c) \frac{1}{2} or 0.25$	B1	D = 101 (7y 10)(7y 10)
	6	
$16.(a) 3/5 \times 2/4$	M1	
= 6/20 (= 3/10)	A1	ISW
(b) Strategy, use of two odds	S1	
$= 2/5 \times 1/4$	M1	
= 2/20 (1/10)	A1	ISW
(c) 1 – their answer in (b), provided S1 awarded in (b)	M1	Or equivalent full sum of product that would lead to 18/20
= 18/20 (=9/10)	A1	ISW
	7	
17. (a) 122° and 238° with no other values	B2	B1 for either angle, or the sum of their 2 angles is 360 with neither
		angle $>5^{\circ}$ different
(b) Vertical translation	M1	
Vertical +1	A1	Mark intention not accuracy, vertical scale need not be marked
	4	
$18.(a) \ 3 \times 3x = (x+4)(x+1)$	M1	Or with common denominator shown (maybe incorrect).
or $3 \times 3x - (x + 4)(x+1)$ as a numerator		Mark for intention, i.e. brackets maybe omitted
Expansion of $(x + 4)(x+1) = x^2 + x + 4x + 4$	A1	
$x^2 - 4x + 4 = 0$ or equivalent	A1	
(x-2)(x-2) = 0 or correct use of the formula	M1	FT for equivalent level of difficulty only
x=2	Al	
(b) $(x-3)(x+2)$ (x+7)(x+2)	BI	
(x+/)(x+2)	BI	CAO Mark final answar
$\frac{x-3}{x+7}$	ы ві	CAU. Mark linal answer
x+/	8	

PAPER 2 - HIGHER TIER

2011 Summer Paper 2 Wales Pilot Higher Tion	Mark	Comments
$1 (a) 3 \times 10 5 / 5$	M1	
= 6.3 (litres)	A1	
(b) $16 \times 45/100$ or 0.45×16 or other method	M1	
(£) 7.2(0)	A1	
(£) 23.2(0)	A1	FT their 45% + 16 if M1 awarded.
		(Alternative $145\% \times 16 \text{ M2}$, (£)23.2(0) A1)
(c) Small brush $40(p)$ or (£0).4(0)	Bl	$\mathbf{FT}(1_{1}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}, 1_{2}$
Fine brush $(80/100) \times 40$ or 0.8×40		F I their cost of a small brush II $< \pm 1$
52 (þ)	A1 8	CAU
2 (a) Line from Milan	M1	Angles are $+2^{\circ}$
Line from Rome	M1	
Lines intersecting	A1	FT if at least M1 given
(b)(i) 70 / 1.66	M1	
(£) 42.17	A1	
46.35 / 1.09	M1	
(±) 42.52	AI	Penalise inappropriate rounding, or not rounding once only
		<i>Treat reverse of exchange leading to answers of 27.92 and 64.22 as SC2</i>
(ii) E.g. Buy Italy because more expensive. (but only a	E1	FT provided M2 awarded in (i)
little) but he can have it straight away OR		Ignore incorrect calculation of the difference in price
Buy Switzerland to save (a little) money	8	
3.(a) Sight of 12 or +15 within a full substitution	B1	
9	B1	CAO
(b) Sight of $(6 \times 9)^3$ or equivalent	Bl	Allow B1 for sight of -157464
15/464		CAO
4 (a) Area tranezium = $\frac{1}{2}(6+8) \times 5$		
35 (cm ²)	Al	Maybe implied in later working
Triangle: $\frac{1}{2} \times 10 \times x = 35$	M1	FT their area of a trapezium
$\mathbf{x} = 7 \ (\mathrm{cm})$	A1	Watch for a correct answer from incorrect working leaving
		out ¹ / ₂ from both formulae this gets SC1
(b) Least 19.5 (cm)	B2	B1 for each correct answer
Greatest 20.5 (cm) (accept 20.49 recurring)	D1	Equation marks given in stages FT until 2 nd ennor
$ \begin{array}{c} (c) \ x + 83 + 107 + 5x - 300 \\ 4x + 192 = 360 \end{array} $	B1	Equation maybe given in stages F1 until 2 error Where 180 (or similar) is used:
4x = 168	B1	x + 85 + 107 + 3x = 180 B1
$x = 42^{(0)}$	B1	$4x = -12 \qquad B1$
		Do not FT for negative answer
		Answer correct, no equation formed or shown, including trial &
		improvement, award B2.
	10	If the only equation seen is ' $x=42$ ' then max B2 only
5(a) 3n + 4 or equivalent correct answer	R2	Allow 'n = $3n + 4$ ' for R? R1 for $3 \times n$ seen (not $n+3$)
S.(a) SH · · · Of equivalent correct answel	102	If B2 awarded penalise further incorrect working -1
(b) E.g. second difference found to be 2 OR sight of n^2	M1	Allow change of letter
$n^2 + 1$	A1	
(c) Strategy, e.g. attempt to use algebra for the terms or	S1	
trial from a starting number keeping to		
either difference criterion or sum criterion	141	
a, $a+7$, $a+14$, $a+21$ or equivalent $A_{2} + A_{2} = 6 \text{ OR } A_{2} = -36$		OK signi of at least 3 trials keeping to 1 criterion
-9 -2 5 12	B1	OR B4 for sight of the correct terms -9 -2 5 12
-, -, -, -	8	
6.(a) $26 = \pi r^2$	M1	
$r^2 = 26/\pi$ (=8.27)	M1	
r = 2.8(768)	A1	
Radius 2.9 (cm) or 3 (cm) (1) $100 - 5$ y $100/5$ 26	Al	CAU
(b) $180 = 5 \times \dots$ or $180/5$ or 36 seen		Realising sides are the same length
side \wedge side = 30 or \vee 30 seen	A1 A1	Watch for embedded answer which is accepted
o (cm)	7	

2011 Summer Paper 2 Wales Pilot Higher Tier	Mark	Comments
7. (a) 600.00	B1	For a correct 4%. (Implied by 48 or 648 or 552)
$\begin{array}{c} \underline{24.00} \\ 624.00 \\ \underline{24.96} \\ (\pounds)648.96 \end{array} \qquad OR \ 600 \ (1.04)^2 \ M2 \\ (\pounds)648.96 \ A1 \end{array}$	M1 A1	Overall method 2 calculations of 4% of different amounts. Method NOT accuracy Accept 649.
(b) One correct evaluation $6 \le x \le 7$ 2 correct evaluations $6.25 \le x \le 6.4$ one either side of 0	B1 B1	$\begin{array}{ccc} \text{(Depreciation answer 576 gets B1 M1 A0)} \\ 6 & -36 \\ 6.1 & -25.219 \\ 6.2 & -14.072 \\ \underline{6.3} & -2.553 \end{array}$
2 correct evaluations, $6.25 \le x \le 6.35$, one either side of 0 OR correct evaluation for 6.35 if previous B1 awarded	M1	6.4 9.344 6.25 -8.359 6.5 21.625 6.35 3.34787 6.6 34.296 6 6 6.7 47.363 6
Correct conclusion 6.3 Evaluation rounded or truncated to 1 sig. fig.	A1	 6.8 60.832 6.9 74.709 7 89 If values are not shown DO NOT accept the use of statements, e.g. "greater than 0". Unsupported 6.3 gets B0 B0 M0 A0
(c) $\{-16 + \sqrt{16^2 - 4 \times 2 \times 23}\}/2 \times 2$ = $\{-16 \pm \sqrt{72}\}/4$ -1.88 and -6.12	M1 A1 A1 10	For substitution, allow one slip in sign or substitution CAO
8.(a)(i) Polygon with at least two vertices correct (horizontal & vertical) All 4 vertices at correct positions	M1 A1	Ignore bars. Accept the intention of straight lines drawn without a ruler Ignore starting at 0 and right hand end. SC1 for a correct polygon or curve using all 4 vertices but translated horizontally, or SC1 for all vertices plotted corrected
 (ii) 30 <t 40<="" li="" ≤=""> (b) Interquartile range = (36 to 37) - (23 to 24) inclusive Correct evaluation (c) Yes with a correct explanation referring to median of the second class and the group containing the median for the first class </t>	B1 M1 A1 E2	 but no polygon or points joined with a curve. Accept any indication "30 to 40", but not a single value. Allow M1 for correct intention (using 37.5 & 12.5) but with incorrect reading of time scale. Median needs to be referenced, once for E1 and for both for E2 Part (b) median is between 30 to 31 inclusive E1 for Yes, explanation refers only to median of the second race E0 for 'Yes' E0 for general discussion of what happens in races
9.(a) $y = 34.7 \times \sin 57$ = 29(.1 cm) (b) $\cos w = 6.6/14.5$ $w = 62.9(^{\circ}) \text{ or } 63^{(0)}$	M2 A1 M1 A2 6	M1 for $\sin 57 = y/34.7$ A1 for $w = \cos^{-1} 0.45(52)$
10. E.g. $x + y = 6.6$ 1.85x + 1.62y = 11.29 or equivalent in pence Method to find first variable First variable found Second variable	B1 B1 M1 A1 A1	Equate coeffs. or substitution, allow 1 slip x = 2.6(0) or $y = 4(.00)FT 6.6(0) – first variable, only if M1 awardedAward all 5 marks for sight of correct valuesTrial & improvement:With totals 6.6(kg)$
	5	At least 3 trials total cost, t where $10 \le t \le 12$ M2(or M1 for any 2 triasl)At least 2 trials total cost, t where $11 \le t \le 11.50$ M2(or M1 for any 1 trial)Correct valuesA1
11.Strategy, e.g. to consider ratio 14500/ 9440 (= 1.536) (14500 / 9440) × 8.56 (million)	S1 M1	Or 8.56 (million)/9440 Or [8.56 (million)/9440] × 14500 For S1 & M1 allow incorrect place value, focus on digits 856, 944 & 145 and the <u>correct</u> operations
Approximately 13 million $1.3() \times 10^7$	A1 A1 4	САО

Wates Prior Higher Ther12.(a) Mid points 5, 14, 23 5 Σ^{6} , 40 (= 542/40) Σ^{6} , 40 (= 542/40) (£) 13.55B1 FT for correct sum of their π terms intention to divide by 40 FT heir Σ^{6} , 40 correctly evaluated(b) Strategy, 50× frequency density = 90 or equivalent Uniform scale, implied or shownB1 Each square 0.2 FT <i>heir</i> Σ^{6} , 40 correctly evaluated50×1.8 + 50×2.6 + 100×1.6 + 100×1 + 200×0.4 (£) 560N1 (£) 560N2 A131.(a) $h \neq x^{2}$ $5 = k \times 10^{2}$ or $5 \times c = 10^{2}$ $h = 0.05v^{2}$ B1 $h = 0.05v^{2}$ N1 A1 A1 Accept for $k = 5/100, k = 0.05, r = 20$ provided used in (b) Maybe sen in (b) or (c). [gnore incorrect use of \propto FT incorrect k for M marks only $r = 17.88854$ (m/s)M1 A1 Accept for $k = 5/100, k = 0.05, r = 20$ provided used in (b) Maybe sen in (b) or (c). [gnore incorrect use of \propto FT incorrect k for M marks only A1 Accept for $k = 5/100, k = 0.05, r = 20$ provided used in (b) Maybe sen in (b) or (c). [gnore incorrect use of \propto FT incorrect k for M marks only A1 Accept for $k = 5/100, k = 0.05, r = 20$ provided used in (b) Maybe sen in (b) or (c). [gnore incorrect use of \propto FT incorrect k for M marks only A1 Accept rounded or truncated T A1 Accept rounded or truncated T A1 Accept rounded or truncated T A2 A1 Accept signt of 8 × ar of 9 × ar for S1 M1 M215. Radius of the cylinder = 0.5 cm OR diameter = 1 cm Idea height of cylinder approx. circumference of ring Na find answerB1 A1 A1 A1 A2 A2 A2 A2 A2 A2 A2 A2 A3B1 A1 A2 A2 A2 A2 A2 A2 A2 A2 A3CAO Accept 'circumference of the ring is the same as the length	2011 Summer Paper 2	Mark	Comments
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Wales Pilot Higher Tier	D1	
$ \begin{array}{cccc} SX/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 23 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 + (4 \times 28 + 28 \times 5) \\ \hline ST/1 $	12.(a) Mid points 5, 14, 23	BI	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$5 \times 7 + 14 \times 28 + 23 \times 5$	MI	FT for their mid points from within group including bounds
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	$\sum fx/40$ (= 542/40)	Ml	FT for correct sum of their fx terms intention to divide by 40
(b) Strategy, 50× frequency density = 90 or equivalent Uniform scale, implied or shownS1Or sight of 1.8 Each square 0.2 FT their uniform scale incorrect but correct answer (£)560 given, as they was no request to complete the scale $50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$ (£)560M1M1 $50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$ (£)560M1M2 $13.(a) h \propto v^2$ $5 = k \times 10^2$ or $5 \times c = 10^2$ $h = 0.05v^2$ B1 $h = 0.05v^2$ FT non linear only in all parts Accept for $k = 5/100, k = 0.05, or c = 20$ provided used in (b) Maybe seen in (b) or (c). Ignore incorrect use of \propto FT incorrect k for M marks only $k = 7.2$ (m) or equivalent $v = 17.88854$ (m/s)M1 A1(c) $16/0.05 = v^2$ $v = 17.88854$ (m/s)A1 Allow S1 α B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if not simplified to these) B1 for $x^{1/2}$ or y^3 or $y^{2/7}$ (do not accept if and us acon $x^{1/2}$ or $y^{1/2}$ (do not accept if not	(£) 13.55	Al	FT their $\sum fx / 40$ correctly evaluated
Uniform scale, implied or shownB1Each square 0.2 $50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$ (£)560A1A1 $50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$ (£)560A1M2A1 COO $dilow S1 derivers and the event of the event of$	(b) Strategy, $50 \times$ frequency density = 90 or equivalent	S1	Or sight of 1.8
$ \begin{array}{c} 50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4 \\ (\pounds) 560 \end{array} \begin{array}{c} PT \ their uniform scale if possible for method marks \\ MI \ for any 3 correct products within the overall sum \\ CAO \\ Allow SI & BI marks if scale incorrect answer (\pounds) 560 \\ given, as they was no request to complete the scale \\ 9 \\ 9 \\ \end{array}$	Uniform scale, implied or shown	B1	Each square 0.2
$ \begin{array}{c} 50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1.4 + 200 \times 0.4 \\ (E) 560 \\ \end{array} \\ \begin{array}{c} M2 \\ (E) 560 \\ \end{array} \\ \begin{array}{c} M2 \\ A1 \\ \end{array} \\ \begin{array}{c} M2 \\ CAO \\ Allow SI & & B1 \\ marks if scale incorrect but correct answer (£) 560 \\ given, as they was no request to complete the scale \\ \end{array} \\ \begin{array}{c} 9 \\ 9 \\ \end{array} \\ \begin{array}{c} 9 \\ \end{array} \\ \begin{array}{c} M1 \\ FT non linear only in all parts \\ Accept for k = 5/100, k = 0.05, or c = 20 provided used in (b) \\ Maybe seen in (b) or (c). Ignore incorrect use of \propto \\ FT incorrect k for M marks only \\ \Lambda 1 \\ \end{array} \\ \begin{array}{c} A1 \\ Accept for k = 5/100, k = 0.05, or c = 20 provided used in (b) \\ Maybe seen in (b) or (c). Ignore incorrect use of \propto \\ FT incorrect k for M marks only \\ \Lambda 1 \\ \Lambda 1 \\ \end{array} \\ \begin{array}{c} A1 \\ Accept rounded or truncated \\ \end{array} \\ \begin{array}{c} 7 \\ 14.(a) x^{12}y^2 \\ (b) (x + 4) (x + 1) \\ \end{array} \\ \begin{array}{c} B1 \\ FT and use of the cylinder = 0.5 cm OR diameter = 1 cm \\ Idea height of cylinder approx. circumference of ring \\ Ring C = 2 \times \pi \times value between 8 and 9 inclusive \\ Volume in the range 39.5 to 44.4 (cm3) inclusive \\ Volume = \pi^{3}0.5^{3} \times ring C \\ Volume in the range 39.5 to 44.4 (cm3) inclusive \\ Statement about assumption, e.g. mid value for radius, or used maller pradius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger radius so volume will be greater, or used larger sint 6 \\ \begin{array}{c} FT their angle P, not 46 or 58 \\ FT their angle P, not 46 or 58 \\ FT candidate's SQ \\ CAO \end{array} $			<u>FT their uniform scale if possible for method marks</u>
(£)560A1CAO Allow S1 & B1 marks if scale incorrect answer (£)560 given, as they was no request to complete the scale13(a) $h \propto v^2$ $5 = k \times 10^2$ or $5 \times c = 10^2$ $h = 0.05v^2$ B1 $h = 0.05v^2$ FT non linear only in all parts Accept for $k = 5/100, k = 0.05, or c = 20$ provided used in (b) Maybe seen in (b) or (c). Ignore incorrect use of \propto FT incorrect k for M marks only(b) $h = 0.05 \times 12^2$ $h = 7.2$ (m) or equivalent $v = 17.88854$ (m/s)A1 A1(c) $16 / 0.05 = v^2$ (=320) $v = 17.88854$ (m/s)A1 A1(b) $(x + 4) (x + 1)$ B2 B1B1 for $x^{1/2} or y^2 or y^{2/1}$ (do not accept if not simplified to these) B1 for $x^{1/2} y^{2/2}$ B1 for $(x+4) ((x+4)-3)$ OR $x^2 + 5x + 4$ Mark final answer(b) $(x + 4) (x + 1)$ B2 B2B1 for $x^{1/2} or y^2 or y^{2/1}$ (do not accept if not simplified to these) B1 for $x^{1/2} y^{4/2}$ B1 for $(x+4) ((x+4)-3)$ OR $x^2 + 5x + 4$ Mark final answer(b) $(x + 4) (x + 1)$ B2 B2B1 for $x^{1/2} or y^2 n y^{2/1}$ (do not accept if not simplified to these) B1 for $x^{1/2} y^{4/2}$ B1 for $(x+4) ((x+4)-3)$ OR $x^2 + 5x + 4$ Mark final answer(c) $2 \times \pi \times$ value between 8 and 9 inclusive Volume in the range 39.5 to 44.4 (cm ³) inclusive Statement about assumption, e.g. mid value for radius, or used smaller radius so volume will be greater, or used larger radius so volume will be less(a)6(b) $SQ^2 = 8.8^3 + 10.9^3 - 2 \times 8.8 \times 10.9 \times cos37$ Sin46 sin76M1 A1 A1 A1 A2 A2 = $5.0 \times sin46$ sin 76(b) $Q = SQ \times sin46$ sin 76A1 PQ PQ answers between 4.86 to 4.9 (cm) inclusiveA1 A1 A1 A1 A1 A1 <br< td=""><td>$50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$</td><td>M2</td><td>M1 for any 3 correct products within the overall sum</td></br<>	$50 \times 1.8 + 50 \times 2.6 + 100 \times 1.6 + 100 \times 1 + 200 \times 0.4$	M2	M1 for any 3 correct products within the overall sum
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GCSE Mathematics - Wales Pilot MS - Summer 2011



WJEC 245 Western Avenue Cardiff CF5 2YX Tel No 029 2026 5000 Fax 029 2057 5994 E-mail: <u>exams@wjec.co.uk</u> website: <u>www.wjec.co.uk</u>