General Certificate of Secondary Education Tystysgrif Gyffredinol Addysg Uwchradd

MARKING SCHEMES

SUMMER 2007

MATHEMATICS
(2 Tier)

GCSE Mathematics 2007 Foundation paper 1 Pilot examination	Mark	Comments Final Version
1. (a) (i) 38 62 (ii) 84 72 (iii) 72 (iv) 45 (b) (i) 8763 (ii) 3687 (c) (£) 120	B1 B1 B1 B1 B1 B1 B1 7	CAO CAO CAO CAO CAO CAO CAO
2. (a) (i)Draw a circle radius 6cm (ii) 12(cm) (b) (i) 9.7 (ii) 26 (iii) 117	B1 B1 B1 B1 B1 5	$\pm$ 2mm CAO $\pm$ 2mm $\pm$ 2° ***Check diagram for answers*** $\pm$ 2°
3. Wednesday 3 Thursday 3¼ Friday 5¾ Sunday 4½	B1 B1 B1 B1 4	CAO CAO CAO CAO
4. (a) 5 x 4 + 25 (£) 45 (b) Number of hours x 5 = 75 – 25 Number of hours = 10	M1 A1 M1 A1 4	M1 for attempted multiplication AND addition. CAO ***Accept embedded answers*** CAO ***e.g. 10 × 5 + 25 = 75***
5. (a) $^{9}/_{25}$ ISW (b) Shade any 15 squares. (c) $^{2}/_{8}$ $^{7}/_{28}$ (d) 50 (%) 60 (%) 0.6 54% ½ or equiv.	B1 B1 B2 B1 B1 B1 7	Or equivalent **fraction** Or the equivalent of 15 squares. B1 for 1 correct or 1 correct and 1 incorrect or 2 correct and 1 incorrect. CAO CAO CAO
6. Completing the figure	B2 2	-1 for each incorrect vertex, or curve, maximum deduction –2 giving B0.
7.(a) $^{5}/_{6} \times 42$ 35 (b) 16 × 6 96 (c) 120/8 (£)15	M1 A1 M1 A1 M1 A1 6	 CAO CAO CAO

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8. (a) 60 (°) $^{60}/_{360}$ ISW (or equiv.) (b) $\frac{120}{360}$ x 96 32	B1 B1 M1 A1 4	$\pm$ 2° FT for 'their' angle in the range 50 to 70 (120 $\pm$ 2)° 118° gives 31.47 122° gives 32.53 FT from (a) for 2 × 'their fraction' × 96 **Answer only 32/96 gets M1 A0**
9. (a) (i) Subtract four 'from the last term' (ii) Multiply 'the last term by' three' (b) (8 + 4) x 6 72 (c) (i) 13y (ii) 10p (iii) 7a – 3b (d) 12 – 14 –2 (e) (i) 15 – 2x ISW (ii) 3y × 3y $(3y)^2$ $9y^2$	E1 E1 M1 A1 B1 B1 B2 B2 B1 B1 B1 13	 CAO CAO B1 for 7a or –3b B1 for 12 or 14 B0 for $3y^2$
10. Length of RS = 3cm and length of AB = 12 cm Actual length of AB = 4 × 2 (metres) Actual length = 8 metres	B1 M1 A1 3	$\pm$ 2mm for each length (B1 for 4 divisions shown on the diagram) ***Check the diagram for answers.***
11. (a) 180 – 90 – 63 or 90 – 63 27 (b) (180 – 86)/2 47 y = 133	M1 A1 M1 A1 A1 5	 CAO ***In (a) and (b) check the diagrams for answers.*** FT **Answer only 47 (°) gets M1 A1 A0**
12. (a) 20 × 45 /100 (£)9 (b) (i) 8 × 25 200 (ii) 1.06 (iii) (0).15 (iv) 12 (c) (i) 13 (ii) 64	M1 A1 B2 B1 B1 B1 B1 B1 9	 CAO B1 for 8 or 25 CAO CAO CAO CAO CAO CAO

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13. Line from Criccieth Line from Aberystwyth Lines crossing	M1 M1 A1 3	Give M1 M0 A1 if only one line is correct but the 2 lines drawn intersect.
14. $^{140}/_{200}$ x 100 or $^{48}/_{60}$ x 100 70 (%) 80 (%)	M1 A1 A1 3	M1 for either CAO CAO
15. (a) $2\times\pi\times10$ or $2\times3.14\times10$ 62.8 (cm) (b) Trap. ½ (55+45)×30 1500 (cm^2) Circle $\pi\times10^2$ (3.14×10^2) 314 (cm^2) Area of card = 1186 (cm^2)	M1 A1 M1 A1 M1 A1 B1 7	 CAO CAO CAO FT when one M1 has been given and an attempt has been made to calculate the second area.
16. (a) 13/30 (b)0+13+20+24+8+10 (75) 'their sum'/50 1.5	B2 M1 m1 A1 5	B1 for den. 30 OR num. 13 in a fraction <1 -1 for use of ' in ' ' out of ' ' : ' CAO
17. 200 x 60 0.2 60,000	B1 B1 B1 3	 FT for **correct calculation** when 0.1, 0.3, 0.4, 0.5 or 0.25 is used.
18. Angle bisector of ADC Perp. bisector of DC Arc radius 7cm centre A Shaded area	M1 M1 M1 B1 4	$\pm$ 2° $\pm$ 2° $\pm$2mm $\pm$ 2mm
19. (a) 4 (b) Suitable uniform scale Plot points Draw curve (c) Line y = 2 Coords. from their graphs	B1 B1 P1 C1 B1 B1 6	CAO Must fit graph paper provided Allow one error, **must use a uniform scale**. Dependent on P1 being given. FT for 'their scale' FT for their curve and their line.

GCSE Mathematics 2007 Foundation paper 2 Pilot examination	Mark	Comments Final Version
1. (a) 65.76 40.92 18.75 156.(00)	B1 B1 B1 B1 4	CAO CAO CAO FT for one error
2. (a) 62 63 64 65 66 67 68 69 70 (b) (i) Kilogram Kg tonne (ii) Litre L ml (iii) Kilometre Km	M1A1 B1 B1 B1 5	M1 for attempting to count squares. Accept ccs, cm^3 , cl. CAO
3. (a) 11,753 (b) 20 – (6.25 + 11.56) (£) 2.19 (c) 50 – 3 x 14.89 (£) 5.33 (d) 50% = ½ OR ¼ = 25% 50% (½) is a greater reduction than 25% (¼)	B1 M1 A1 M1 A1 E1 6	CAO CAO CAO
4. 13 27 8 22 10 Labels correct Uniform scales Bars correct	B1 B1 M1 A1 4	CAO FT from table
5. (a) (i) 29 ISW (ii) 28 ISW (b) (i) □□□□ 4 □□□□□□□□ 8 □□□□□□□□□□□□ 12 (ii) 5 + 10 + 15 30	B1 B1 B1 M1 A1 5	CAO CAO CAO M1 for any 2 correct + a third number. M1 for the use of 'pattern no.' × 6. CAO
6. (a) Hexagon Trapezium (b) A D	B1 B1 B1 3	CAO CAO CAO
7. (a) (-5,-3) (b) (4, -1)	B1 B1 2	CAO CAO
8. (a) (i) 7 (ii) 11 (b) -6 (c) 12 + 24 36	B1 B1 B1 B2 5	CAO Accept embedded answers CAO CAO B1 for 12 or 24

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9. (a) (i) 91 (ii) Attempt to add the numbers OR (451 seen) 451/11 OR 'their sum'/11 41 (b) 21 21 22 24 26 27 27 28 32 Median 26	B1 M1 m1 A1 M1 A1 6	CAO If M1 is given allow m1 for division by 10 or 12 CAO Attempt to order the numbers CAO
10.(a) 20 30 (b) 5.75 x 4 + 25.55 (£) 48.55 (c) $\frac{14 \times 24500}{100}$ (£) 3,430 ISW (d) (i) 16.81 (ii) 9.6 (e) (i) 2 (ii) 2.3408 (f) 4.64 4.6	B1 B1 M1 A1 M1 A1 B1 B1 B1 B1 B1 B1 12	CAO CAO CAO Answer only 48.55p gets M1 A0 Answer only (£)27,930 gets M1 A0. CAO CAO CAO CAO CAO CAO
11. (a) $20 \times 10 \times 25$ 5000 cm^3 ml (b) 4000 'their 4000'/(20×10) 20 5 (cm) OR 4000 5000 – 'their 4000' 'their difference'/(20×10) 5 (cm)	M1 A1 U1 B1 M1 A1 A1 B1 M1 m1 A1 7	 CAO Must attempt to change 4l into cm^3 for this M1 to be given. FT FT Must attempt to change 4l into cm^3 for this M1 to be given. FT for 5000 from (a) FT for one error only in the arithmetic.
12. Line of length 12 cm $\pm$ 2mm Line of length 9 cm $\pm$ 2mm Line of length 7.5 cm $\pm$ 2mm	B1 B1 B1 3	If the triangle is not completed a maximum mark B2 should be given. SC1 for use of a different scale if completely correct.
13. Sand costs 2.25×18 (£)40.50 1 bag of cement $(63 – 2.25 \times 18)/6$ (£)3.75	M1 A1 M1 A1 4	 CAO FT
14. (a) $360 – (102 + 65 + 98)$ = 95 y = 85 (b) Correct reflection	M1 A1 A1 B1 4	Answer only y= 95 gets M1 A1 A0. FT CAO

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15.(a)Idea of ordered pairs plotted At least 8 pairs plotted correctly, not joined. (b)Positive (correlation).	M1 A1 B1 3	At least 4 points plotted correctly.
16.(a)(i) $3x = 21$ $x = 21/3$ ISW (7) (ii) $3x = 30$ OR $x/5 = 2$ $x = 30/3$ ISW $x = 10$ (iii) $2x = -8$ $x = -8/2$ ISW (b) $7(a+3)$	B1 B1 B1 B1 B2 B1 B1 8	In (a) (i) to (iii) stop at 2nd error. Accept embedded answers in (i),(ii) and (iii). B1 for 2x and B1 for –8 ***Stop at 2nd error*** Accept 7 x (a+3), (a+3) x 7
17.(a) (i)150,000 x 1.5/100 60,000 x 2.4/100 (£) 2,250 + (£) 1,440 (£) 3,690 ISW (ii) 210,000/20 (10,500) 84,000 73,500 52,500 (b) 25 × 30/100 (£)7.50 (£)32.50	M1 M1 A1 A1 M1 A2 M1 A1 A1 10	 For either 2250 or 1440 CAO A1 for 1 correct A2 all correct. FT
18. Sight of 7(cm) $(AD^2) = 7^2 + 18^2$ $(AD^2) = 373$ (AD) = 19.31(32…) (AD) = 19.3 or 19	B1 M1 A1 A1 A1 5	 FT FT FT
19. One correct evaluation (1sf) $3.7 \leq x \leq 3.8$ 2 correct evaluations $3.746 \leq x \leq 3.764$ one either side of 0 2 correct evaluations $3.746 \leq x \leq 3.755$ one either side of 0 OR correct evaluation of 3.755 if previous B1 awarded. Correct conclusion 3.75	B1 B1 M1 A1	x $x^3 - 5x - 34$ 3.7 –1.847 3.71 –1.485 3.751 0.021 3.72 –1.121 3.752 0.058 3.73 –0.754 3.753 0.096 3.74 –0.386 3.754 0.133 3.75 –0.015 3.755 0.17 3.76 0.357 3.77 0.732 3.78 1.11 3.79 1.489 3.8 1.872

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Paper 1 Pilot 2007 Higher Tier		**Comments**
1. 1 ½ x 150 or 1 ½ x 50 OR sight of 225 or 75 or 25 (White) 225 (ml)	M1 A1 2	Accept equivalent, e.g 300/4
2. 5x - 15y + ….. 11x - 25y	B1 B1 B1 3	Expansion of brackets FT until 2nd error FT for their expansion FT for their expansion Penalise further incorrect working -1
3. x = 136^0 y = 44^0 z = 44^0	B1 B2 B1 4	 B1 for sight of 180–136. FT y = 180 – x FT z = y or z = 180 - x
4. ½ x 8 x 3 = 12 cm^2	M1 A1 U1 3	Attempt ½ base x height seen, e.g. 4 x 3
5. Line from Criccieth Line from Aberystwyth Lines crossing	M1 M1 A1 3	Give M1 M0 A1 if only one line is correct but the 2 lines drawn intersect.
6. $^{140}/_{200}$ x 100 or $^{48}/_{60}$ x 100 70% 80%	M1 A1 A1 3	M1 for either CAO CAO
7. (a) 2 x π x 10 62.8(…cm) or 63 (cm) (b) Trap. ½ (55 + 45)x30 1500 (cm^2) Circle π x 10 x 10 314(.2…cm^2) Area of card = 1185.8(…cm^2) or 1186 (cm^2)	M1 A1 M1 A1 M1 A1 B1 7	 CAO CAO CAO FT if M1 given and attempt made to calculate the other area
8. 0+13+20+24+8+10 (=75) 'their sum'/50 1.5	M1 m1 A1 3	 Need to have worked with sum of *fx* CAO
9. 200 x 60 0.2 60 000	B1 B1 B1 3	 FT for **correct calculation** when 0.1, 0.3, 0.4, 0.5 or 0.25 is used.
10. Angle bisector of ADC Perp. Bisector of DC Arc radius 7cm centre A Shaded area	M1 M1 M1 A1 4	$\pm 2^0$ $\pm 2^0$ and $\pm$2mm $\pm$2mm CAO
11. (a) 4 (b) Suitable uniform scale Plot points Draw curve (c) Line y = 2 Coords. from their graphs, x values	B1 B1 P1 C1 B1 B1 6	CAO Must fit graph paper provided Allow one error. FT their **uniform** scale Depends on P1 being awarded FT their scale FT for their curve & their horizontal line.
12.(a) Enlargement 1/2 Correct position (b) Correct rotation, Vertices at (3,0),(6,0),(6,-2),(3,-2) (c) Translation	B1 B1 B2 B1 5	 E.g. R' at (3,4) B1 for anticlockwise 90^0 correct centre, OR B1 for clockwise 90^0 around (0 , 2), OR B1 for 2 correct vertices or 3 near miss CAO (ignore spelling)

13. 5x +20 –3x +6 = 0 2x + 26 = 0 x = -26/2 ISW (=-13)	B2 B1 B1 4	B1 for 3 correct LHS terms. FT 'til 2nd error Collect like terms
14.(a) Median = 6.5 to 6.75 (b) Intention to subtract reading from horizontal axes for 75th%ile and 25th%ile. 4.5 ≤ Interquartile range ≤ 5	B1 M1 A1 3	8.5 – values between 3.5 & 4 inclusive SC1 for consistent misread of scale in (b) but otherwise correct, OR SC1 for both quantities correct but not subtracted
15. Correctly setting up 2 eqns for 1 variable, First variable's value Correctly substituting their first variable Second variable's value	M1 A1 M1 A1 4	Allow 1 error in any of the other 4 coeffs. Either x = 10.5 or y = -8 FT their first variable FT their first variable
16. 9/6 x 7 = 10.5 (cm)	M1 A1 2	Or equivalent, e.g 3.5 +7 Or equivalent improper fraction
17.(a) (i) 1 (ii) 7 .. (b) 0.4545… or 0.45 (c) 1/27 (d) Either improper fraction 17/5 x 5/3 = 85/15 or 17/3 or $5\ ^2/_3$ (e) LCM = 36 and HCF = 6	B1 B1 B1 B1 B1 B1 B2 8	 DO NOT accept 0.454.., 0.45 or 0.4545 B1 for either improper fraction CAO B1 for either. B0 if answers reversed
18. (a) $x^2 = 8y – 3y + 13$ $x^2 = 5y + 13$ $x = (\pm)\sqrt{5y + 13}$ (b) (3x-2)(x+4) x = 2/3 and x = -4	B1 B1 B1 B2 B1 6	FT until 2nd error ISW. Accept $x = (\pm)\sqrt{(8y – 3y + 13)}$ B1 for (3x 2)(x 4) or partial working e.g. 3x(x+4) – 2(x+4) FT their pair of brackets
19 . (a) y α 1/x OR y = k/x 4 = k/6 y = 24/x (b) x: ½ | 6 | **8** y: **48** | 4 | 3	B1 M1 A1 B2 5	 FT(throughout) non linear only Maybe implied in part (b) B1 for each value, do not accept 24/ ½ for 48
20. 0, 0.3, 1, 3, 5, 2, 0.1 Correct histogram	B2 B1 3	B1 for any 5 correct FT their frequency density only if suitable for axes given
21. (a) 6/20 x 5/19 = 30/380 (= 15/190 = 3/38) (b) Strategy, e.g 1 – P(no yellow) OR P(y, not y) P(not y, y) P(y,y) considered 1 – 7/20 x 6/19 OR correct values in the sum of products 338/380 ISW (= 169/190)	M1 A1 M1 A1 A1 5	 Or equivalent. Ignore incorrect cancelling Or equivalent split by colour. Strategy mark is awarded even if replacement used. 1 – 42/380 CAO
22. (a) 25 + 15√2 + 15√2 + … (3 terms correct) = 43 + 30√2 (b) (x=0.24343.. with) intention to subtract 100x – x or 1000x – 10x 241/990	M1 A1 M1 A1 4	Or **any** 3 terms from 25+15√2+15√2+18 24.1/99 gets M1

23.(a) Reflection (b) Translation to the right Clearly touches (0,0) (c) Vertical translation 6 indicated on the y axis	B1 B1 B1 B1 B1 5	 Allow SC1 for left shift with -4 indicated.
24. $4x^2 + 2(3x+2) = x(3x + 2)$ $4x^2 + 6x + 4 = 3x^2 + 2x$ $x^2+4x+4=0$ and $(x + 2)(x + 2) = 0$ $x = -2$	M1 A2 M1 A1 5	Attempt to multiple through by x and 3x+2 A1 for LHS, A1 for RHS Collect like terms & factorise or use formula. FT their quadratic, M1 only CAO SC1 for $\frac{4x^2+6x+4}{x(3x+2)} = 1$

Paper 2 Pilot 2007 Higher Tier		**Comments**
1.(a) $7x12 - 8x5$ or $2x7 + 8x2 + 2x7$ $= 44$ (cm^2) (b) $12 + 14 + 10 + 12$ (= 12+7+7+5+5+8+2+2) = 48 (cm) (c) Sight of 100cm = 1m 64000 (cm^2)	M1 A1 M1 A1 M1 A1 6	Or equivalent calculation shown Or equivalent calculation shown (M0 A0 for an answer of 640)
2. (a) 11, 14, 19 (b)(i) -12 (ii) 3(n+6) or 3x(n+6) ISW (c) $2x + 3x + 5x = 180$ $10x = 180$ $x = 18$	B2 B1 B2 M1 A1 A1 8	B1 for any one term correct B1 for missing brackets CAO. Answer only gets SC1
3.(a)Idea of ordered pairs plotted At least 8 pairs plotted correctly, not joined. (b)Positive (correlation).	M1 A1 B1 3	At least 4 points plotted correctly.
4.(a) (i) $3x = 30$ OR $x/5 = 2$ $x = 10$ (iii) $2x = -8$ $x = -8/2$ ISW (b) $7(a+3)$	B1 B1 B2 B1 B1 6	In (a) (i) & (ii) stop at 2nd error. B1 for 2x and B1 for –8 Accept 7 x (a+3), (a+3) x 7
5.(a) (i)150,000 x 1.5/100 60,000 x 2.4/100 (£) 2,250 + (£) 1,440 (£) 3,690 ISW (ii) 210,000/20 (10,500) 84,000 73,500 52,500 (b) 25 × 30/100 (£)7.5(0) (£)32.5(0)	M1 M1 A1 A1 M1 A2 M1 A1 A1 10	 For either 2250 or 1440 FT for 1 error if M1 M1 given. A1 for 1 correct A2 all correct. FT
6. Sight of 7(cm) $AD^2 = 7^2 + 18^2$ $AD^2 = 373$ AD = 19.3132… AD = 19.3 or 19	B1 M1 A1 A1 A1 5	 FT FT
7. One correct evaluation (1sf) $3.7 \leq x \leq 3.8$ 2 correct evaluations $3.75 \leq x \leq 3.76$ one either side of 0 2 correct evaluations $3.75 \leq x \leq 3.755$ one either side of 0 OR correct evaluation of 3.755 if previous B1 awarded. Correct conclusion 3.75	B1 B1 M1 A1 4	x $x^3 - 5x - 34$ 3.7 –1.847 3.71 –1.485 3.72 –1.121 3.73 –0.754 3.74 –0.386 3.75 –0.015 3.755 0.17 3.76 0.357 3.77 0.732 3.78 1.11 3.79 1.489 3.9 1.872 *Accept "too big" etc. instead of values*

8. 600.00 24.00 624.00 24.96 648.96 OR $600(1.04)^2$ M1 648.96 A2	B1 M1 A1 3	For a correct 4%. For the overall method (2 stages of adding different 4%). C.A.O. Ignore subsequent working. SC1 for (£)648 (simple interest), alternatively they may get the B1 for (£)624 or (£)24 if seen. *Depreciation 552.96 implies B1*
9. (a) 4n + 1 (b) n (n + 1) or $n^2 + n$	B2 B2 4	B1 for 4n + … B0 for n+ 4 Accept n x (n+1). B1 for sight of n^2
10. (a) 2/5, 7/10, 3/10, 7/10 on correct branches (b) 3/5 x 3/10 = 9/50	B2 M1 A1 4	B1 for one correct entry
11. (a) 497.5 and 502.5 (b) Use of greatest sheet 102.5 (cm) 497.5 – 102.5 = 395 (cm)	B2 B1 M1 A1 5	B1 for each. Accept recurring decimals FT their least roll – their greatest sheet provided 495≤least roll<500 and 105≥greatest sheet>100 SC1 for 500 – (100 < value < 105)
12.Any 3 of the lines y=5, y = x-8, x=8 and y=-5x drawn Correct region indicated	B3 B1 4	Award B2 for any 2 lines OR B1 for any 1 line drawn or indicated CAO
13. (a) (i) 2.3×10^7 (ii) 9.8×10^{-4} (b) 1.62×10^9	B1 B1 B2 4	Penalise -1 once only for incorrect notation B1 for 16.2×10^8 OR $n \times 10^9$ where $n = 5.4x3/10$ incorrectly evaluated OR 1 620 000 000 OR $1.6x10^9$
14.(a) $\sin 52^0 = AB / 32$ AB = 25.(216…mm) (b) cos S = 32.5 / 43.8 S = 42.(097..)	M1 A2 M1 A2 6	 A1 for AB = 32 x $\sin 52^0$ A1 for cos S = 0.742…)
15.$\sum x^2$ =322 or mean 5.2 or $\sum (x\text{-mean})^2$= 51.6 $322/10 – 5.2^2$ or 51.6/10 or 5.16 Standard deviation = 2.27(15…) or 2.3	B1 M1 A1 3	Not just sight of needs to be associated FT if possible (calculations shown)
16.(a) 25^0 Angle in same segment, (angles in triangle) (b) 68^0 Alternate segment theorem	B1 E1 B1 E1 4	 Accept calculations shown, or appropriate description for E marks
17.(a) ½ (4x+6) (2x – 3 + 10) = 70 ½ $(8x^2 + 40x + 42) = 70$ or $4x^2 + 20x + 21 = 70$ Leading to $4x^2 + 20x – 49 = 0$ (b) $x = \{ -20 \pm \sqrt{(20^2 – 4 . 4 . -49)} \} / 8$ $= [-20 \pm \sqrt{1184}] /8$ x = 1.8 and x = -6.8 (Answer to 1dp) (c) 13.2 (cm)	M1 A1 A1 M1 A1 A1 B1 7	Area trapezium using terms given Must FT from correct working, CAO Allow one error CAO. Allow disregarding –ve if justified FT 4x(b) + 6 only if (b)>0 *Trial & imp. in (b) SC2 for 1 value to 1dp.* *B0 if +ve & -ve given*

18. Total = 6810 Number of people / 6810 x 18 1.49…, 0.91…, 0.84…, 5.62…, 9.11… 1, 1, 1, 6, 9	B1 M1 M1 A1 4	 FT their total Any 3 correct
19.(a) **JM** = **JL** + **LM** (= 3**x** + 2**y** + 5**x** – 2**y**) = 8**x** (b) k = 5 Collinear (or along the same straight line)	M1 A1 B1 B1 4	 Maybe embedded Do not accept parallel as a full description
20. Overall strategy (1/2absinC & cos rule) 42.6 = ½ x 6.2 x AC x sin 72 AC = 14.4(49…. cm) $BC^2=6.2^2 + AC^2 – 2$ x 6.2 x AC x cos 72 BC^2 = 191.8(…) BC = 13.8(… cm) or 13.9 (cm)	B1 M1 A1 M1 A1 A1 6	 FT their AC Accept values between 190.6 and 192