Version 1.0

ASSESSMENT and QUALIFICATIONS ALLIANCE

## General Certificate of Secondary Education

# Mathematics 4301

*Specification A*

## Paper 2 Foundation

# Mark Scheme

*2008 examination - November series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' 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.

| | |
|---|---|
| **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. |
| **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. |
| **ft** | Follow through marks. Marks awarded following a mistake in an earlier step. |
| **SC** | Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth. |
| **oe** | Or equivalent. Accept answers that are equivalent.<br>eg, accept 0.5 as well as $\frac{1}{2}$ |

# Paper 2F

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **1(a)** | Eight thousand two hundred and seven | B1 | No numerals allowed |
| **1(b)** | (Two) hundred | B1 | 200 |
| **1(c)** | 8200 | B1 | Accept answer in words |
| **1(d)** | 7006 or 7 006 | B1 | 7.006 is B0 |
| **2(a)** | 121 | B1 | |
| **2(b)** | 137 | B1 | |
| **2(c)** | 29 | B1 | |
| **3(a)** | £ 22.98 | B1 | 2298 p |
| **3(b)** | 20 – 2 **x** 6.99 | M1 | 2000 – 2 × 699 |
| | £ 6.02 | A1 | Allow 602 p if £ sign deleted |
| **3(c)** | 3 × 17.99 (= 53 97) **or** 3 × 18<br>4 × 17.99 (= 71.96) **or** 4 × 18 | M1 | 60 ÷17.99 ( = 3.3…..) **or** 60 ÷ 18 (= 3.3…) |
| | 3 | A1 | |
| **4(a)** | 3.6 to 4.0 | B1 | |
| **4(b)** | 108 to 112 | B1 | 248 to 252 |
| **4(c)** | Line of symmetry of sector drawn | B1 | Accept line drawn in major sector |
| **4(d)** | Tangent seen or vertical line at A | B1 | Indication that tangent at A is understood |
| **4(e)** | Chord AB drawn | B1 | |
| **5(a)** | Saturday | B1 | Accept Sat |
| **5(b)** | 7 | B1 | Accept seven |
| **5(c)** | All sectors equal on the pie chart | B1 | oe |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **6(a)** | A (3, 1) B (3, 4) | B2 | B1 For each<br>B1 If A and B interchanged but<br>B0 if co-ordinates transposed |
| **6(b)** | Plotting C and D | B2 | B1 Each plot |
| **6(c)** | Trapezium | B1 | Must be a trapezium drawn in (b) |
| **7(a)** | 80 | B1 | |
| **7(b)** | 3 correct horizontal lines | B2 | B1 For 2 correct lines |
| **7(c)** | 100 | B1 | ft From their graph if graph drawn incorrectly |
| **7(d)** | 180 or 3 hours | B2 | B1 For number in the range 151 to 180 |
| **8(a)** | 1, 2, 11, 22 | B2 | B1 For any 3 (–1 eeoo); extra factors count as errors |
| **8(b)** | 25 | B1 | |
| **8(c)** | 6.16(4414003) | B1 | |
| **8(d)** | 8 is a factor of 16 (not a multiple) or 16 is a multiple of 8 or multiples of 16 are 16, 32, 48 | B1 | oe $8 \times 2 = 16$ |
| **9(a)** | A and C | B1 | C and A |
| **9(b)** | D reflected correctly | B2 | B1 For D reflected then translated |
| **10(a)** | 5.7 to 5.9 inclusive | B1 | |
| **10(b)** | Allow a line somewhere **between** 3.0 and 3.2 | B1 | |
| **10(c)** | 6.4 to 6.8 inclusive | B2 | B1 For **between** 6 and 6.4 or 6.8 and 7 |
| **11(a)** | $3 \times \frac{56}{7}$ or $\frac{3}{7} \times 56$ | M1 | $\frac{168}{7}$ or $3 \times 8$ |
| | 24 | A1 | |
| **11(b)** | 6 and 35 | B2 | B1 For each |
| **11(c)** | $3 \times 2 = 6$ | B2 | B1 For $3 \times$ any prime number |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **12(a)(i)** | 0.165 | B1 | $\frac{33}{200}$, $\frac{165}{1000}$ |
| **12(a)(ii)** | 0.2 | B1 | ft their (i) provided 2 or more sf in (i) |
| **12(b)** | 8 | B1 | 8.(00….) |
| **12(c)** | 39.69 or 39.7 or 4.69(...) or 4.7 seen | M1 | |
| | 44.4 | A1 | 44.38(…….), 44.39(……) |
| **13(a)** | $13x$ | B1 | |
| **13(b)** | $26 = 5P + 3 \times 2$ | M1 | |
| | $5P = 20$ | M1 | |
| | $P = 4$ | A1 | |
| **14** | $65 + 95 + 30 = 190 \neq 180$ so **No**<br>Need to say that Suki is wrong and some indication that angles have been summed | B2 | B1 For angles on a straight line add up to 180 |
| **15(a)** | 8 and 12 | B1 | |
| **15(b)** | Correct plotting on ft to $\frac{1}{2}$ square | B1ft | Bar chart can only score B1 |
| | Line from (0,6) to (5,16) to $\frac{1}{2}$ square | B1 | Allow freehand line if within tolerance |
| **16(a)** | <table><tr><td></td><td>C</td><td>D</td></tr><tr><td>Boy</td><td>3</td><td>2</td></tr><tr><td>Girl</td><td>1</td><td>4</td></tr></table> | B3 | Table can be reversed<br>B1 For correct row<br>B1 For correct column<br>B1 For correct numbers<br>Two separate tables can score B2 |
| **16(b)** | 0.7 | B1 | $\frac{7}{10}$, 70% |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **17(a)(i)** | 3 | B1 | |
| **17(a)(ii)** | 18.53 – 17.57 | M1 | 96 |
| | 56 | A1 | SC1 For 83 or 1hour 23 mins |
| **17(b)** | 27 | B1 | |
| **18** | 4.80 – 1.20 | M1 | 3.60 |
| | Their 3.60 ÷ 8 | M1 | Must do some subtraction<br>(eg, 4.80 ÷ 8 leading to 60p scores M0) |
| | 45 or £0.45 (p)<br>0.45 on answer line and nothing else scores 2 | A1 | SC2 For 360 ÷ 6 leading to 60 p<br>SC2 For 360 ÷ 9 leading to 40 p<br>SC1 For 3.60 ÷ 6 leading to 0.6(0) but £0.60 scores SC2<br>Similar for ÷ 9<br>MUST see working for SC<br>NB 0.45 without £ sign is A0 |
| **19** | 6, 9, 14 | B2 | –1 eeoo<br>NB starting at n=0 gives 5, 6, 9 This is B1 |
| **20(a)** | Correct plots to ± 1 mm | B2 | –1eeoo |
| **20(b)** | Ruled line within tolerance – see additional sheet | B1 | ft their plots – use judgement on line |
| **20(c)** | 4<br>Accept 4 if all points plotted correctly and no line of best fit | B1ft | ft Their line even if curved, discontinuous or non-ruled.<br>If no line of best fit evidence of interpolation from the table must be seen |
| **20(d)** | The longer the flight the lower the cost per mile | B1 | oe<br>**NB MUST** refer to cost per mile directly or implicitly |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **21** | Exterior angle or angle at the centre = 360 ÷ 8 (= 45) | M1 | Angles may be marked on diagram |
| | (180 – their 45) ÷ 2 | M1dep | Their 135 ÷ 2 |
| | 67.5 | A1 | |
| **21 Alt** | (8 – 2) × 180 or 1080 seen | M1 | 135 marked as an interior angle |
| | Their 1080 ÷ 8 ÷ 2 | M1dep | Their 135 ÷ 2 |
| | 67.5 | A1 | |
| **22(a)** | Rectangle, Rhombus, Parallelogram | B2 | B1 For 2 correct |
| **22(b)** | Any 2 (or 3) of Rectangle, Parallelogram, Trapezium | B1 | |
| **22(c)** | Rectangle<br>Parallelogram | B1 | NB If 6(c) is correctly done then these answers are acceptable:<br>Rectangle has angles which are all $90^o$<br>Rectangle has 2 lines of symmetry<br>Rectangle has equal length diagonals<br>Parallelogram angles are not all the same<br>Parallelogram has no lines of symmetry<br>Parallelogram has unequal diagonals |
| **Additional Guidance**<br>As 22(b) cannot be seem give the mark for any quadrilateral quoted provided that the property (or properties) given is (are) **correct and unique** to that quadrilateral. eg, If square chosen then "four lines of symmetry " is enough but "right angled corners" is not ["Right angled corners and all sides the same" would do] | | | |
| **23** | 665 – 500 (=165) | M1 | $\frac{665}{500} \times 100$ (=133) |
| | $\frac{\text{Their } 165}{500} \times 100$ | M1dep | Their 133 – 100 |
| | 33 | A1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **24(a)** | $6x - 42$ | B1 | $6 \times x - 42$ is B1 but $6 \times x - 6 \times 7$ is B0 |
| **24(b)** | $2x^2 + 3x - 4x^2 + 4$ | M1 | Allow 1 sign or arithmetic error but must have 2 terms in $x^2$, one term in $x$ and one constant term |
| | $-2x^2 + 3x + 4$ | A1 | oe |
| **25** | $5^2 - 1.7^2$ | M1 | $x^2 + 1.7^2 = 5^2$ |
| | $\sqrt{22.11}$ | M1dep | M1 For squaring and subtracting then showing the need to square root |
| | 4.7(……..) | A1 | |
| **26** | $15\,000 - 0.2 \times 15\,000$ | M1 | $12\,000$ $15\,000 \times 0.8$ |
| | Their $12\,000 - 0.2 \times$ their $12\,000$ | M1dep | $12\,000 \times 0.8$ ($15\,000 \times 0.8^2$ is M2) |
| | 9600 | A1 | |