**AQA**

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A L L I A N C E

**General Certificate of Secondary Education**

# Mathematics 4302
*Specification B*

**Module 3  Tier H  43003H**

# Mark Scheme

*2007 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.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

**The following abbreviations are used on the mark scheme:**

**M**          Method marks awarded for a correct method.

**A**          Accuracy marks awarded when following on from a correct method.
               It is not necessary always to see the method.  This can be implied.

**B**          Marks awarded independent of method.

**M dep**      A method mark which is dependent on a previous method mark being
               awarded.

**ft**         Follow through marks.  Marks awarded for correct working following a
               mistake in an earlier step.

**SC**         Special Case.  Marks awarded for a common misinterpretation which has
               some mathematical worth.

**oe**         Or equivalent.

**eeoo**       Each error or omission.

## MODULE 3    HIGHER TIER                    43003H

| 1(a) | $1.126582\ldots$ or $\frac{89}{79}$ | B1 | or better |
|------|-------------------------------------|-----|-----------|
| 1(b) | 1.127 | B1 ft | ft if (a) given to at least 4 dp |

| 2 | $60 \times 1.65$  or  $100 \div 1.65$ | M1 | |
|---|---------------------------------------|-----|--|
| | 99        or    $60.60\ldots$ | A1 | Allow 60.6, 60.60, 60.61, 60.606 or better |
| | $100 - \text{their } 99$ <br> or  their $60.60\ldots - 60$ | M1 dep | May be implied |
| | England by €1  or  by 60p/61p | A1 ft | Must have correct unit <br> ft to nearest cent or penny rounded or truncated |

| 3 | $0.39 \times 800 \ (= 312)$ | M1 | oe   or sight of 0.61  or  61% |
|---|------------------------------|-----|-------------------------------|
| | $800 - (\text{their } 312)$ | M1 dep | oe   $800 \times 0.61$ |
| | 488 | A1 | |

| 4(a) | Actual increase is $1900 - 600$ | M1 | $1.9 - 0.6$          $\frac{1900}{600} \times 100$ |
|------|--------------------------------|-----|----------------------------------------------------|
| | their $\frac{1300}{600} \times 100$ | M1 dep | their $\frac{1.3}{0.6} \times 100$     their $316.(6)-100$ |
| | $216.(6\ldots)$ | A1 | Accept 217,  220 |
| | 200 | B1 ft | ft any number $\geq 2$ sf |
| 4(b) | $1.12 \times 600$ | M1 | 672 |
| | $0.9 \times 1300$ | M1 | 1170 |
| | their $672 +$ their $1170$ | M1 dep | Dependent on both M1s |
| | 1842 | A1 | SC3  2382 |

| 5 | Any of 1, 2, 3, 4, 6, 9, 12, 18, 36 **and**  36 <br> or   4 **and** 18 <br> or  12 **and** 18 <br> or   4 **and** 9 <br> or   9 **and** 12 | B2 | A pair of factors of 36 which have a different LCM    B1 <br> eg  4 and 12, 6 and 6 |
|---|---|---|---|

| 6 | Largest = 82 000 | B1 | oe |
| | Smallest = $3 \times 10^{-2}$ | B1 | 0.03   oe |

| 7 | Even $\times$ odd = even **or** <br> odd $\times$ even = even | B1 | |
| | Even $\times$ odd = even **and** <br> odd $\times$ even = even | B1 | SC1  at least two correct examples shown with clear evidence of $\times$ |

| 8 | After 1 day = 64% left <br> After 2 days = $0.64 \times 0.64$ <br> (= 0.4096) left | M1 | Accept use of amount <br> eg  $0.64 \times 1000$ (= 640) <br> their 640 $\times$ 0.64 (= 409.6) for M1 |
| | $\times$ 0.64 3 more times = 0.107… | A1 | $0.64^5 = 0.107…$   M1A1 |
| | No with either 10.7…% or 89.2…% seen | A1 | |

| 9 | $\times$ by $\frac{\sqrt{6}}{\sqrt{6}}$ | B1 | Sight of $\frac{18\sqrt{6}}{\sqrt{6}\sqrt{6}}$   oe |
| | Sight of denominator of 6 | B1 | Remember answer was given, must convince <br> SC1  $3\sqrt{6} \times \sqrt{6} = 18$ <br> Allow $\frac{18\sqrt{6}}{6}$ for B2 |

| 10 | Sight of <br> 8.5 or 9.5 or 7500 or 8500 | B1 | or 0.905 or 90.5 <br> Accept $9.4\dot{9}$ for 9.5 and 8499 (.99) for 8500 |
| | Chooses their max price and their max reduction | M1 | Max price > 8000 <br> Max reduction >9 or >0.09 <br> or <0.91 or <91  Sensible value |
| | $\frac{8500}{0.905}$ or $\frac{8500}{90.5} \times 100$ | M1 | oe |
| | £9392.27 or £9392(.00) | A1 | Sight of 9392.265(1…)   SC3 |

| 11(a) | Attempts to multiply numerators and denominators | M1 | |
|---|---|---|---|
| | $\dfrac{6}{55}$ | A1 | oe |
| 11(b) | Shows intention to times by $\dfrac{1}{4}$ | M1 | oe   $0.375 \div 4$   $3 \div 32$ |
| | $\dfrac{3}{32}$ | A1 | 0.09375 |

| 12(a) | $\dfrac{6}{10}$ | B2 | oe fraction          $\dfrac{4}{10}$   B1 |
|---|---|---|---|
| | $3 \times 50$  or $6 \times 50$ | M1 | Also allow $4 \times 50$ for M1 if $\dfrac{4}{10}$ above |
| | Men = 150 | A1 | |
| | Children = 300 | A1 | |
| 12(b) | 3 : 1 | B1 | oe   eg  $150 : 50$  or  $\dfrac{3}{10} : \dfrac{1}{10}$ |

| 13(a) | $1\dfrac{2}{3} \times 2$ | M1 | $3\dfrac{1}{3}$  or  $\dfrac{10}{3}$  or  $2\dfrac{4}{3}$   oe<br>Allow decimals $\geq 2$ dp rounded or truncated<br>$2 + 2 = 4$  or  $2 \times 2 = 4$   M0A0 |
|---|---|---|---|
| | 4 | A1 | |
| 13(b) | $1\dfrac{2}{3} + 1\dfrac{1}{4}$ | M1 | |
| | $(1)\dfrac{8}{12}$ (+) $(1)\dfrac{3}{12}$ | M1 | oe   Valid denominator, at least one correct numerator  (1).66 (+) (1).25 |
| | $2\dfrac{11}{12}$ and some indication of yes | A1 | 2.91  or  2.92 and Yes   oe |

| 14 | 16 (×) 9 | M1 | Must have both |
|---|---|---|---|
| | 144 | A1 | |

6

| 15 | All three correct<br>Statement 1 matches Table B<br>Statement 2 matches Table C<br>Statement 3 matches Table A | B2 | B1 for one (or two) correct |
|---|---|---|---|

| 16(a) | Plots 4 coordinates correctly<br>**and**<br>draws a reasonable curve through the points | B1 | Be generous as poor curves will almost certainly lose marks later |
|---|---|---|---|
| 16(b) | their first solution $\pm \dfrac{1}{2}$ small square | B1 ft | |
| | their second solution $\pm \dfrac{1}{2}$ small square | B1 ft | |
| 16(c) | $x$ coordinate 1.5 → 1.7<br>$y$ coordinate −4 → −3.5 | B1<br>B1 | No ft   Inclusive |

| 17 | Correct method for recurring decimal | M1 | eg  let $x = 0.\dot{2}$ then<br>$10x = 2.\dot{2}$ and subtract<br>so $9x = 2$ etc |
|---|---|---|---|
| | $\dfrac{2}{9} \times \dfrac{9}{20}$ attempted | M1 dep | oe  $\dfrac{2}{9} \times \dfrac{45}{100}$ attempted<br>or  $0.45 \div 9 \times 2$ attempted<br>or  0.1 |
| | $\dfrac{1}{10}$ | A1 | oe   fraction |

| 18(a) | $\dfrac{1}{\sqrt{5^2}}$  or  $\left(\dfrac{1}{\sqrt{5}}\right)^2$  or  $\dfrac{1^2}{\sqrt{5^2}}$  or  $5^{-1}$ | M1 | |
|---|---|---|---|
| | $\dfrac{1}{5}$ | A1 | oe |
| 18(b) | $\sqrt{5}\sqrt{45} = \sqrt{5 \times 45}$ | M1 | or  $\dfrac{\sqrt{5} \times \sqrt{45}}{5} = \dfrac{\sqrt{45}}{\sqrt{5}}$<br>or  $\sqrt{45} = \sqrt{9}\sqrt{5}$ |
| | $\sqrt{225} = 15 \div 5 \ (= 3)$ | M1 | $\sqrt{9} \ (= 3)$  or  $\dfrac{\sqrt{5}\sqrt{9}\sqrt{5}}{5} = \sqrt{9} \ (= 3)$ |
| | $\sqrt{3}$ | A1 | Allow $3^{\frac{1}{2}}$ |