# AQA

**A S S E S S M E N T  and**
**Q U A L I F I C A T I O N S**
**A L L I A N C E**

# General Certificate of Secondary Education

# Mathematics 3302
## *Specification B*

*Module 3  Tier I  33003I*

# Mark Scheme
## *2006 examination – March 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.

**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       INTERMEDIATE TIER                     33003I

| 1 | $77 \div 1.4$ | M1 | (€)14 = (£)10<br>(€)70 = (£)50<br>(€)7 = (£)5<br>**and** adds last two lines |
|---|---|---|---|
|  | 55 | A1 | |

| 2(a) | $0.38 \times 146$ | M1 | $146 \div 100 \times 38$<br>Build up: eg  10% = 14.6(0)<br>                  30% = 43.8(0)<br>                    8% = 11.68<br>**and** adds last two lines |
|---|---|---|---|
|  | 55.48 | A1 | Digits 5548 implies M1 |
| 2(b) | $\frac{108}{150} \times 100$ | M1 | $108 \div 150 \times 100$<br>Build up: eg  10% = 15<br>                  70% = 105<br>                    2% = 3<br>**and** adds last two lines |
|  | 72 | A1 | SC1  Answer 28 |

| 3 | $1330 - 480 \ (= 850)$ | M1 | |
|---|---|---|---|
|  | their $850 \div 170$ | M1 dep | Adds four, five or six lots of 170<br>**or**<br>Subtracts four, five or six lots of 170 from their 850<br><br>M2 for 480 + four, five or six lots of 170 |
|  | 5 | A1 | Do not award if their 5 has clearly been rounded |

| 4 | $11 \div \frac{1}{4}$  or  $11 \div 0.25$  or  $11 \times 4$ | M1 | Allow $11 \div 0.15$  or  $11 \div 15$ only if followed by correct answer of 44 |
|---|---|---|---|
|  | 44 | A1 | |

| 5 | $(77 - 32) \times 5 \div 9$ and attempt at full evaluation using brackets | M1 | or 3 steps attempted separately |
|---|---|---|---|
|  | 25 | A1 | 59.(...)                                      M0 |

| 6(a) | 1.31696(…) | B1 | |
|---|---|---|---|
| 6(b) | 1.3 | B1 ft | ft their (a) if > 1 dp |

| 7(a) | 5 | B1 | |
|---|---|---|---|
| 7(b)(i) | 0.0428669(…) | B1 | Allow 0.042867 |
| 7(b)(ii) | 0.0429 | B1 ft | ft from value > 3 sf seen |

| 8(a) | 572 ÷ 13 (= 44) | M1 | |
|---|---|---|---|
| | their 44 × 25 | M1 dep | their 44 × 12 + 572 |
| | 1100 | A1 | SC1  Answer 528 |
| 8(b) | It depends upon the actual numbers of girls and boys in the year **or** Gives a number of girls and boys for Year 10 that is not in the ratio 13:12 **or** Gives a ratio for girls to boys that is not 13:12 | B1 | There may be more boys (than girls) There may be fewer girls (than boys) There may be the same number of each gender |

| 9(a) | 3.2 | B1 | |
|---|---|---|---|
| 9(b)(i) | their 3.2 × 0.8 evaluated correctly | B1 ft | 2.56 if (a) correct |
| 9(b)(ii) | their (b)(i) × 0.8 × 0.8 | M1 | 1.6(384) if correct Could be seen in stages ie  their (b)(i) × 0.8    their calculated value × 0.8 If starts again must see $4 \times 0.8^4$ |
| | 3 | A1 | **3 with no working scores M0A0** Do not award A1 for an answer of 3 if there were numerical errors previously SC2  2.0(48) and answer 3 |
| 9(c) | Sight of 0.7(0) | M1 | 70(%) = 1.82 |
| | 1.82 ÷ 0.7 | M1 | 1(%) = 1.82 ÷ 70   (= 0.026) 100(%) = their 0.026 × 100 |
| | 2.6 | A1 | SC2  Answer 2.275 SC1  Digits 26 |

| 10(a) | $1.153 \times 10^6$ | B1 | Allow $1.153000 \times 10^6$ |
|---|---|---|---|
| 10(b) | Attempt to add 1 153 000, $4.07 \times 10^5$ and 4.6 million | M1 | Numbers all in same form with at least two correct |
| | 6 160 000 (oe)  and  Yes | A1 | Must have both |

| | | | |
|---|---|---|---|
| 11(a) (i) | 10:24 | B1 | Allow 10:24 am |
| 11(a) (ii) | Attempts difference between 10:24 and 11:15 (eg build up) | M1 | Can attempt difference between the other pairs of Crewe and Liverpool times |
| | 51 | A1 | 0:51(h)  M1A0<br>91 is M0 |
| 11(b) | Train does not stop at Nuneaton<br>Train does not stop there | B1 | Train does not go to Nuneaton<br>Train does not go there |

| | | | |
|---|---|---|---|
| 12(a) | 4.84 | B1 | |
| 12(b) | $6 \times 6 \times 6$ | M1 | $36 \times 6$ |
| | 216 | A1 | |
| 12(c) | $\dfrac{6}{35}$ | B1 | oe fraction |
| 12(d) | $\dfrac{(15)}{20}\ (-)\ \dfrac{(4)}{20}$ | M1 | Common denominator of 20 **with 1 numerator correct**<br>(or 40, 80 etc)<br>Allow 0.75 – 0.2 |
| | $\dfrac{11}{20}$ | A1 | oe fraction<br>Allow 0.55 |

| | | | |
|---|---|---|---|
| 13 | $\dfrac{10(\times)20}{8(-)3}$ **or** $\dfrac{10(\times)20.1}{8(-)3}$ | M1 | At least 2 values correct<br>Allow $\dfrac{200}{5}$ **or** $\dfrac{201}{5}$<br>Any attempt to evaluate without rounding  M0 |
| | 40 **or** 40.2 | A1 | |

| 14 | $2 \times \dfrac{3}{4} \times 7$ | M1 | $2 \times 0.75 \times 7$ |
|---|---|---|---|
| | $10\dfrac{1}{2}$ | A1 | oe |
| | 11 | B1 ft | ft from non-integer values only (must round to nearest integer above) |
| | | | SC2 $\dfrac{3}{4} \times 7$ or $5\dfrac{1}{4}$ Answer 6 (tins) <br> SC2 $\dfrac{3}{4} \times 7$ or $5\dfrac{1}{4}$ 6 seen <br> and answer 12 (tins) |
| | | | SC1 Answer 6 with no working <br> SC1 $\dfrac{3}{4} \times 7 = 5\dfrac{1}{4}$ |
| | | | SC3 $\dfrac{3}{4} \times 7 = 5\dfrac{1}{4}$ 12 (tins) <br> **but only if fully explained** (eg that the cats eat different food) |
| | | | Answer of 14 (which assumes tins are thrown away if not used fully) scores no marks at all |

| 15(a) | 6172.8 | B1 | |
|---|---|---|---|
| 15(b) | 26.5 | B1 | |

| 16 | $\dfrac{5}{100} \times 400$  (= 20) | M1 | **Note** $400 \times 1.05$ or $400 \times 1.05^2$ scores M1 <br> No further marks can be awarded unless they get the correct answer (which obtains full marks) |
|---|---|---|---|
| | $\dfrac{5}{100} \times \{400 + \text{their 5\% of 400}\}$ | M1 dep | = 21 if correct |
| | 441 | A1 | |

| 17(a) | Lists    (9)  18  27  36 …<br>**and**    (12)  24  36 … | M1 | 9 = 3 (×) 3<br>12 = 2 (×) 2 (×) 3 |
|---|---|---|---|
| | 36  or  $2^2 \times 3^2$ | A1 | SC1  Answer 72<br>SC1  Answer $2 \times 2 \times 3 \times 3$ |
| 17(b) | 2 (×) 54   or   3 (×) 36 | M1 | Using 2 or 3 in valid method<br>eg  factor tree<br>Do not award for a list of all factors<br>even if in product pairs |
| | $2 \times 2 \times 3 \times 3 \times 3$ | A1 | $2^2 \times 3^3$ but index form not needed.<br>If correct answer is converted to<br>index form incorrectly regard as<br>further work<br>Do not allow 1 as a factor |

| 18(a) | $3.97 \times 10^{-7}$ | B1 | |
|---|---|---|---|
| 18(b) | 0.75 **or** $10^{-4}$ seen **or** correct<br>answer in any form | B1 | eg  0.000075 |
| | $7.5 \times 10^{-5}$ | B1 | SC1  Answer $7.5^{-5}$ |

| 19 | $\frac{7}{4}$ (÷) $\frac{15}{11}$ | M1 | Conversion of both fractions to<br>**improper** fractions **(one fraction<br>must be correct)** |
|---|---|---|---|
| | their $\frac{7}{4}$ × their $\frac{11}{15}$ | M1 dep | Change to multiplication and<br>inversion of second fraction |
| | $\frac{77}{60}$ | A1 | $1\frac{17}{60}$   If correct answer converted<br>to mixed number<br>incorrectly regard as<br>further work |

| 20 | Sight of 33.5  or  34.5 | M1 | Allow 34.49… for 34.5<br>$0.5 \times 10$ gets M1 |
|---|---|---|---|
| | 335 g  and  345 g | A1 | Allow 344.9… for 345<br>Need both answers<br>SC1  One correct answer |