Version 1.0

## General Certificate of Secondary Education

# Mathematics 4360

## Unit 3 Higher Tier 43603H

# Mark Scheme

*Specimen Paper*

## Mark Schemes

Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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



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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. |
| **Q** | Marks awarded for quality of written communication. |
| **M dep** | A method mark dependent on a previous method mark being 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 $\frac{1}{2}$ |
| **eeoo** | Each error or omission. |

# Unit 3 Higher Tier

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **1(a)** | Fully correct rotation | B3 | B1 180º rotation with centre $\theta$<br>B1 90º clockwise rotation with wrong centre<br>B2 90º clockwise rotation with centre $\theta$<br>B2 90º anticlockwise rotation with wrong centre |
| **1(b)** | $x = -1$ | B2 | B1 For coordinates plotted or line shown on graph |
| **2** | $5 \times 4.47$ | M1 | |
| | Their $22.35 \times 27$ | M1 dep | |
| | 603 | A1 | |
| | 600 < 603 so not speeding | A1 | oe |
| | **Alternate method** | | |
| | $600 \div 27$ (= 22.22) | M1 | |
| | Their $22.22 \times 10 \div 4.47$ | M1 dep | |
| | 49.71 | A1 | |
| | 49.71 < 50 so not speeding | A1 | oe |
| **3** | Sometimes true | B1 | |
| | Valid explanation | B1 | eg, height of triangle can vary |
| **4** | $39 \div 3$ or $39 \div 6$<br>or $19.5 \div 3$ or $19.5 \div 6$ | M1 | oe |
| | 13 or 6.5 seen | A1 | |
| | $13 \times 13$ | M1 | |
| | 169 | A1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **5** | Multiples of 8 (at least 4)<br>8, 16, 24, 32, 40, 48, 56, … | M1 | Either $8x$ or $9(12-x)$ $x+y=12$ |
| | Multiples of 9 (at least 4)<br>9, 18, 27, 36, 45, 54, 63, … | M1 | $8x+9(12-x)=103$ $8x+9y=103$ |
| | 40 and 63 | M1 | $8x+108-9x=103$ $9x+9y=108$ |
| | 5 | A1 | |
| **6(a)** | 5 (equal) exterior angles must total 360° **and**<br>$360 \div 5 = 72$ or $5 \times 72 = 360$ | B1 | $360 \div 5 = 72$ is not enough … there must be some reference to exterior angles |
| **6(b)** | $2 \times 72$ or $360 - (2 \times 108)$ | M1 | oe |
| | $(x =)$ 144 | A1 | |
| **7** | $\pi \times 3.5 \times 3.5$ or $\pi \times 5 \times 5$ or<br>$\pi \times 7 \times 7$ | M1 | $12.25\pi$ or $25\pi$ or $49\pi$ |
| | $\pi \times 3.5 \times 3.5 + \pi \times 5 \times 5$ | M1 | |
| | $47.25\pi$ **and** $49\pi$ | A1 | |
| | He is correct | A1 ft | ft If both Ms awarded |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **8(a)** | $x(x + 10)$ | B1 | |
| **8(b)** | $(y + 6)(y - 6)$ | B1 | |
| **8(c)** | $5w + w = 9 - 6$ | M1 | Allow one sign error |
| | $6w = 3$ | M1 | For collecting like terms<br>ft Their first line |
| | $\frac{1}{2}$ | A1 | oe Accept $\frac{3}{6}$ |
| **8(d)** | LCM of 12 used correctly or attempt at LHS multiplied by 12 | M1 | |
| | $6x + 9 + 4x - 20$ | M1 | Allow one error |
| | $10x - 11 = 18$ | A1 | $10x - 11 = 3$ scores A0 |
| | 2.9 | A1 ft | ft From **one** arithmetic error but **not** from $10x - 11 = 3$ |
| **9(a)** | $\frac{1}{2} \times (7 + 11) \times 5$ | M1 | |
| | 45 | A1 | |
| **9(b)** | Their $45 \times 16$ | M1 | or 720 |
| | $19.3 \times$ their 720 | M1 | |
| | 13896 | A1 | |
| | 13.896 | A1 ft | ft If both Ms awarded |
| **10** | $6 \times 2$ ($\times 1$) or 12 | B1 | |
| | $12 \times 1.25$ | M1 | |
| | 15 | A1 | |
| | $15 \times 49.50$ ($+ 30$) or<br>$5 \times 67.50$ ($+ 430$) ($= 337.50$) | M1 | |
| | (£)742.50 or (£)772.50 | A1 | |
| | Company B and (£)767.50 | Q1 | Strand (iii)<br>An organised response leading to a correct conclusion |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **11(a)** | D | B1 | |
| | A | B1 | |
| | C | B1 | |
| **11(b)** | Negative gradient and through point on positive $y$-axis | B1 | '2' need not be marked |
| **12(a)** | $x^2 = 41^2 - 40^2$ | M1 | |
| | $x^2 = 81$ or $x = \sqrt{81}$ (= 9) | A1 | |
| **12(b)** | $(n+1)^2 - n^2 = m^2$ | M1 | |
| | $n^2 + 2n + 1 - n^2 = m^2$ | M1 dep | |
| | $m^2 = 2n + 1$ | A1 | |
| | $m^2$ is odd since $2n + 1$ is odd | A1 | |
| | $m$ is odd since odd × odd = odd | A1 | |
| **13(a)** | $2x^2 - 7x + 9 = 0$ | B3 | oe –1 eeoo<br>B2 Fully correct expression |
| **13(b)** | Reference to square root of negative number | B1 | |
| **14** | Cos A = $(10^2 + 6^2 - 14^2)$ ÷ (2 × 6 × 10) | M1 | |
| | $-\frac{1}{2}$ | A1 | |
| | 120° | A1 | |
| **15** | Angle *PRQ* = 180° – 134° or 46° | M1 | |
| | Angle *POQ* = 2 × their 46° or 92° | M1 | |
| | Reflex angle *POQ* = 268° | A1 | |

| Q | Answer | Mark | Comments |
|---|---|---|---|
| **16(a)** | (height of cylinder =) 9 | B1 | |
| | $\pi \times 3^2 \times$ their 9 or $81\pi$ | M1 | |
| | $\frac{2}{3} \times \pi \times 3^3$ or $18\pi$ | M1 | oe |
| | $99\pi$ | A1 | |
| **16(b)** | Their $49.5\pi$ – their $18\pi$ or $31.5\pi$ | M1 | Must see use of '$\frac{1}{2}$ of their $99\pi$' |
| | Their $31.5\pi = \pi \times 3^2 \times h$ | M1 dep | dep on previous M1 |
| | $h =$ their $31.5\pi \div (\pi \times 3^2)$ or 3.5 | M1 | |
| | $d = 6.5$ | Q1 | Strand (ii)<br>For correct answer supported by logical working showing key steps |
| **17** | Attempt to rewrite<br>$x^2 - 5x + 3 = 0$ as $x^2 - 4x + 1 = x - 2$ | M1 | |
| | Identify ($y =$) $x - 2$ | A1 | |
| | Accurately draws line $y = x - 2$ | M1 dep | |
| | ($x =$) 0.7 and 4.3 | A1 | ft Their line if both M1s earned |