



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS - COMPONENT 1 (HIGHER)
C300UA0-1**

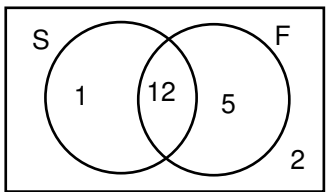
INTRODUCTION

This marking scheme was used by WJEC for the 2017 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

| Eduqas Summer 2017 GCSE (9-1) Mathematics Component 1: Higher Tier | Mark | Comment |
|---|------------------------|--|
| 1.* (a) (i) Valid comment e.g. 'The first line expresses an opinion' or 'It pushes you to give a low answer', or 'It tells you you should not be eating much chocolate' | E1 | Do not allow 'She only asks about one day.' Allow eg 'She says too much chocolate is bad for your health.' |
| (a)(ii) Appropriate criticism e.g. 'It is too vague' or 'How big is a piece?', 'Cannot answer no pieces.' 'Cannot answer more than 6'. | E1 | Allow e.g. 'She is only asking about 1 particular day'. |
| (b) 'No' stated or implied with two valid reasons based on sample size, location, time or targeting teenagers e.g. '10 people is too few', 'People outside a supermarket are not likely to be teenagers' | E2 | E1 for 'No' with only one valid reason Allow eg 'The people could all be different' or 'Monday morning limits the type of people she can ask.' or 'A lot of people may be at work on a Monday morning.' |
| (4) | | |
| 2.* (a) $7x - 3x = 4 - 2$ or equivalent $x = \frac{2}{4}$ or equivalent | B1 B1 | Seen or implied FT until 2nd error FT Mark final answer |
| (b) $3 - 2x + 18 = 5x$ or equivalent $7x = 21$ or $x = \frac{21}{7}$ $x = 3$ | B1 B1 B1 | Seen or implied FT until 2nd error FT FT |
| (c)(i) $3x > 6$ or $-6 > -3x$ $x > 2$ or $2 < x$ | M1 A1 | No marks for use of "=", unless finally replaced to give $x > 2$ then award M1 A1. If M0 then SC1 for $x > \frac{8}{3}$ |
| (c)(ii) Open circle at 2 with arrow right | B1 | STRICT FT 'their (c)(i)' provided an inequality Accept any unambiguous notation; arrow could just be a line but must not clearly terminate unless this follows through from part (c)(i); mark intent |
| (8) | | |
| 3.* Arc (of circle) centre C radius 6 cm \pm 2mm Correct perpendicular bisector construction with appropriate arcs Correct area shaded or indicated | B1 B2 B1 | Tolerance \pm 2mm and \pm 2° Award B1 for appropriate arcs and no line or line outside of tolerance ie no arcs no marks FT provided a closed region bounded by an attempt at a perpendicular bisector, with or without arcs, and the arc of a circle centre C |
| (4) | | |

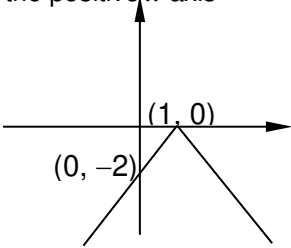
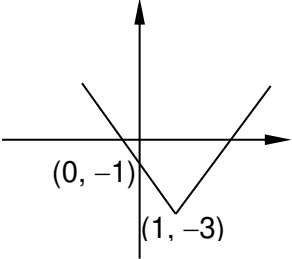
| Eduqas Summer 2017 GCSE (9-1) Mathematics Component 1: Higher Tier | Mark | Comment |
|---|----------------------------------|---|
| 4.* (a) $\begin{pmatrix} -6 \\ 20 \end{pmatrix}$ | B2 | B1 for each element or for $(3\mathbf{q} =) \begin{pmatrix} -12 \\ 21 \end{pmatrix}$ or equivalent seen or for $\begin{pmatrix} -6 \\ 20 \end{pmatrix}$ or for $\frac{-6}{20}$ or for $\frac{-6}{20}$ |
| (b) $6 - 4m = 10$ or for $\begin{pmatrix} 6 \\ -1 \end{pmatrix} + \begin{pmatrix} 4 \\ -7 \end{pmatrix} = \begin{pmatrix} 10 \\ -8 \end{pmatrix}$ or $\begin{pmatrix} 6 \\ -1 \end{pmatrix} - \begin{pmatrix} -4 \\ 7 \end{pmatrix} = \begin{pmatrix} 10 \\ -8 \end{pmatrix}$ $m = -1$ $n = -8$ | M1 A1 B1 | FT $-1 + 7m$ for 'their derived m ' |
| 5.* (Riley, more than £20: Sent separately, Insurance £750 each) Cost £26 seen or (Sent together, Insurance £1500) Cost £22 seen (James, less than £20: Sent together, Insurance £1500) Cost £17.50 seen Valid statement or example using limit of accuracy. e.g. 'The masses could both be less than 1250g', 'One laptop could weigh 1230g and the other 1250g' 'They could have a total mass of 2460' One valid assumption: 'Laptops can be sent separately' 'Laptops can be sent together' 'Packaging does not increase the mass to more than 2500g' | E1 E1 E1 E1 | Not from wrong working For recognising that the limit of accuracy has an impact on the problem; allow for a total mass between 2450 and 2550 or individual masses between 1225 and 1275 Appropriately stated; allow embedded statements eg 'If they are sent together then...' or 'If they are sent separately then ...' or 'If both laptops weigh less than 1250 g then ...' or 'Sent together...' |
| 6. (a)*  | B2 B1 B2 | B1 for 12 in intersection on Venn diagram or for any 2 correct entries ISW FT 'their 12' provided 'their 12' < 20 FT 'their 1' and 'their 13' provided 'their 1' < 'their 13' B1 for denominator of 13 or 'their 13' or numerator of 1 or 'their 1' provided the denominator < 20 |
| (5) | (5) | |

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| <p>10.</p> <p>(a) (exterior angle =) $\frac{360}{8}$ or $45 \times 8 = 360$ (interior angle sum =) 6×180</p> <p>(interior angle =) $180 - \frac{360}{8}$ (=135) or $\frac{6 \times 180}{8}$ (=135)</p> | <p>M1</p> <p>A1</p> | <p>Accept equivalent methods</p> <p>Do not allow $1080 \div 8 = 135$ only, there must be evidence to support 1080</p> <p>Allow SC2 for (exterior angle is) $180 - 135 = 45$ and (exterior angle is) $360 \div 8 = 45$ or for exterior angle sum is 360 oe (exterior angle is) $180 - 135 = 45$ $45 \times 8 = 360$</p> |
| <p>(b)</p> <p>$y + 180 - x + 180 - x + 135 = 360$ or $x = \frac{y}{2} + \frac{135}{2}$ or $\frac{y}{2} + 180 - x + \frac{135}{2} = 180$</p> <p>Convincing working leading to $y = 2x - 135$</p> <p>One correct reason e.g. Angles on a straight line (add up to 180°), Angle sum of a quadrilateral ($=360^\circ$), Symmetry of kite or equivalent</p> | <p>M1</p> <p>A1</p> <p>E1</p> | <p>Accept in any correct form</p> <p>Given answer obtained without any wrong working seen</p> <p>If M0 then award SC1 for verification that $y = 2x - 135$ leads to eg $2x - 135 + 2(180 - x) + 135 = 360$</p> <p>Allow for one correct statement Stated appropriately NB SC1 E1 is possible</p> |
| | (5) | |
| <p>11.</p> <p>Sight of 45.5 cm 60.5 cm and 115 cm or 1.15 m</p> <p>115 – 45.5 – 60.5 seen or implied</p> <p>9 cm</p> | <p>B2</p> <p>M1</p> <p>A1</p> | <p>If units are given they must be correct. Award B1 for any 1 correct.</p> <p>FT 'their 45.5, 60.5 and 115' providing all are in the same units, 'their 45.5' > 45, 'their 60.5' > 60 and 'their 115' < 120 and greater than 'their 45.5 + 60.5' May be in steps</p> <p>CAO; not from wrong working</p> |
| | (4) | |

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| 12. (a) 0.6, 0.8, 0.7, 1.2, 0.2 | B1 | |
| (b) Vertical axis correct and labelled; no gaps between bars Fully correct histogram | M1 A1 | FT candidate's frequency density if table completed incorrectly but the idea of frequency density as frequency ÷ class width is used, Histogram must be attempted FT If M0 then SC1 if correct but not labelled |
| (c) $\frac{5}{32}$ | B2 | B1 for $\frac{0.2 \times 25}{32}$ or $\frac{1}{32} \left(\frac{5}{6} \times 6 \right)$ or equivalent or for ' $\frac{27}{32}$ lasted for less than 35 minutes' or equivalent or for 5 seen |
| (d) $0.8 \times 5 + 0.4 \times 5 + 0.9 \times 10 + 0.5 \times 10$ seen or implied 20 | M1 A1 | 4 + 2 + 9 + 5 |
| (e) Selection of one of the months with a valid supporting comment. e.g. 'April as they were too busy working to chat' or 'April as no time for long calls' or 'April as the calls were shorter'. or 'March as they needed time to talk about revision' or 'March as they needed to talk about how the exams went'. | E1 | |
| | (8) | |
| 13. (a) $\left(\left(\frac{49}{4} \right)^{\frac{1}{2}} \right) = \frac{7}{2}$ or 3.5 or $3\frac{1}{2}$, $(125^0 =) 1$, $(8^{\frac{2}{3}} =) 4$, $(0.75^{-1} =) \frac{4}{3}$ or $1\frac{1}{3}$ | B3 | All 4 correct Do not accept $\frac{1}{0.75}$ or 1.3 but allow correct recurring notation or 1.33(...) Award B2 for 3 correct. Award B1 for 1 or 2 correct. |
| (b) $\sqrt[4]{100} = \sqrt{10}$ or $3^4 = 81$ or $4^4 = 256$ 3 and 4 | M1 A1 | Accept any valid method Not from wrong working Accept unsupported 3 and 4 for 2 marks |
| | (5) | |

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| 14. (a) (gradient of $PQ =) \frac{q-4}{7-1}$ seen or implied $\frac{q+4}{6} = \frac{5}{3}$ seen or implied $q = 6$ | B1 M1 A1 | 'their $\frac{q+4}{6} = \frac{5}{3}$ ' FT their derived gradient; $\frac{q+4}{2} = 5$ implies B1 M1 CAO <u>Alternative method</u> From similar triangles, finds or uses the scale factor $\frac{1}{2}$ or 2 or states $\frac{5}{3} (=) \frac{10}{6}$ <i>B1</i> Forms a valid relationship to find q seen or implied eg $q+4 = 2 \times 5$ or $(q =) 10 - 4$ <i>M1</i> $q = 6$ <i>A1</i> |
| (b) $0 = \frac{5}{3} \times 3 + c$ $(c =) -5$ ISW or $(0, -5)$ | M1 A1 | Allow eg $0 = \frac{5}{3} \times 3 - c$ Accept $y = -5$ |
| (c) $m_{L_2} = -\frac{3}{5}$ or equivalent, seen $1 = -5\left(-\frac{3}{5}\right) + c$ $y = -\frac{3}{5}x - 2$ or equivalent | B1 M1 A1 | Allow eg $\frac{3}{-5}$ as equivalent FT 'their $-\frac{3}{5}$ ', provided $\neq \frac{5}{3}$ Accept other full methods e.g. $\frac{y-1}{x-5} = \text{'their } -\frac{3}{5}$, CAO Accept $\frac{y-1}{x+5} = -\frac{3}{5}$ |
| (8) | | |

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| 16. (a)(i) $\frac{15}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ or $\frac{15\sqrt{5}}{5}$ or $\frac{3 \times 5}{\sqrt{5}}$ $3\sqrt{5}$ | M1 A1 | implies M1 |
| (a)(ii) $10\sqrt{3} - 3\sqrt{3}$ $7\sqrt{3}$ | M1 A1 | |
| (b) Expands $ab - a\sqrt{2} + b\sqrt{2} - \sqrt{2} \times \sqrt{2}$ Identifies ab as an integer and $\sqrt{2} \times \sqrt{2}$ as an integer (Not correct as) an integer when $a = b$ or equivalent | M1 M1 A1 | Allow one error in expansion; may be in a grid May be implied eg $ab - 2$ is an integer $a = b$ must be seen or implied at some point <u>Alternative method 1</u> Stating eg 'difference of two squares if $a = b$ ' B1 Shows eg $a^2 - 2$ M1 Concludes integer A1 <u>Alternative method 2</u> Uses equal numerical values of a and b and expands with at most one error eg $(7 + \sqrt{2})(7 - \sqrt{2}) = 7 \times 7 - 7\sqrt{2} + 7\sqrt{2} - \sqrt{2} \times \sqrt{2}$ M2 Or M1 for using numerical unequal values of a and b and expands with at most one error Or B1 for stating that a and b must be the same Correct numerical working and integer answer A1 |
| | (7) | |

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| 17. Radius of outer circle = 13 or half the chord = 12 $(\text{radius inner circle})^2 + 12^2 = 13^2$ $r = 5$ seen or implied $x^2 + y^2 = 5^2$ | B1 M1 A1 A1 | May be on diagram FT 'their derived 5' If zero scored allow SC1 for $12^2 + 5^2 = 13^2$ or $12^2 + 5^2 = 169$ only |
| | (4) | |
| 18 (a) Reflection in x -axis Correct coordinates seen or scale marked | B1 B1 | Ignore coordinates for this mark; vertex must be on the positive x -axis  |
| (b) Translation through $\begin{pmatrix} 0 \\ k \end{pmatrix}$ where $k < 0$ Correct coordinates seen or scale marked | B1 B1 | Ignore coordinates for this mark; vertex must be in 4th quadrant;  |
| | (4) | |

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|---|------------------------------------|---|
| 19. (a) $R \propto \sqrt{x}$ or $R = k\sqrt{x}$ $900 = k\sqrt{81}$ $k = 100$ $(R =) 100\sqrt{9}$ $(R =) 300$ (cm ³ per min) | M1 M1 A1 M1 A1 | Implies first M1 FT 'their 100' FT |
| | | <p><u>Alternative method using proportions</u></p> <p>Sight of $\frac{900}{\sqrt{81}}$ or $\sqrt{81} (:)$ 900</p> <p>Could be implied in later working <i>B1</i></p> <p>$\frac{900}{\sqrt{81}} = \frac{R}{\sqrt{9}}$ or compares</p> <p>$\sqrt{81}$ or 9 ($:$) 900 with</p> <p>$\sqrt{9}$ or 3 ($:$) 300 <i>M1</i></p> <p>$\frac{900}{\sqrt{81}} \times \sqrt{9} = R$ seen or implied <i>M1</i></p> <p>$100 \times \sqrt{9} (= R)$ seen or implied <i>M1</i></p> <p>$(R =) 300$ (cm³ per min) <i>A1</i></p> |
| (b) $400 = 100\sqrt{x}$ or $\frac{1}{100} = \frac{\sqrt{x}}{400}$ or equivalent or $(\sqrt{x} =) \frac{400}{100}$ or $(\sqrt{x} =) 4$ $(x =) 16$ (cm) | M1 A1 | FT 'their 100' Not from wrong working |
| | (7) | |
| 20. (a) $g(9) (= 9^2 - 1) = 80$ $h(80) = 240$ or $hg(9) = 240$ | B1 B1 | or for $hg(x) = 3(x^2 - 1)$ FT 'their $9^2 - 1$ ' or 'their $3(x^2 - 1)$ ' |
| (b) $h(2x) = 3(2x)$ $gh(2x) = (6x)^2 - 1$ $gh(2x) = 36x^2 - 1$ | M1 M1 A1 | or for $gh(x) = (3x)^2 - 1$ FT 'their $gh(x)$ ' or 'their $h(2x)$ ' CAO |
| | (5) | |

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|--|---|---|
| 21. (a) $20 - x$ | B1 | Accept $\frac{48x}{160+2x}$ |
| <p>(b)(i)</p> $\frac{160}{x} + 2 = \frac{48}{20-x} \quad \text{or} \quad \frac{48x}{160+2x} = 20-x \quad \text{or}$ <p>equivalent</p> <p>Attempts to clear both of the fractions or attempts to use a common denominator on left hand side and cross multiply $160(20-x) + 2x(20-x) = 48x$ or equivalent</p> <p>Expanding the brackets $3200 - 160x + 40x - 2x^2 = 48x$ or equivalent</p> <p>Collects terms and correctly simplifies to $x^2 + 84x - 1600 = 0$</p> | <p>M2</p> <p>FT 'their two-term $20 - x$' for M2</p> <p>M1 for $\frac{48}{20-x}$ or</p> <p>M1 for $\frac{160}{x} + 2 = \text{'their } \frac{48}{20-x}$' or equivalent if 'their $20 - x$' is not two-term '<i>their</i> $\frac{48}{20-x}$' must be in terms of x</p> <p>M1</p> <p>FT 'their two-term $20 - x$'</p> <p>M1</p> <p>FT 'their two-term $20 - x$'</p> <p>A1</p> <p>Convincingly shown as answer given</p> | |
| <p>(b)(ii)</p> $(x + 100)(x - 16)$ <p>$x = 16$ or $x = -100$</p> <p>[motorbike used] 4 [litres]</p> | <p>M1</p> <p>A1</p> <p>A1</p> | <p>Correct factorisation or correct application of the quadratic formula as far as $b^2 - 4ac$ simplified; Solution of equation may be seen in part (b)(i), allow the marks if this is the case</p> <p>No FT on part (a) here</p> |
| | (9) | |