

AQA

GCSE

Mathematics

SET A – Foundation Tier

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F

Answers

Key to abbreviations used within the answers

| | |
|-------|--|
| M | method mark (e.g. M1 means 1 mark for method) |
| A | accuracy mark (e.g. A1 means 1 mark for accuracy) |
| B | independent marks that do not require method to be shown (e.g. B2 means 2 independent marks) |
| C | communication mark |
| oe | or equivalent |
| ft | follow through |
| dep | dependent on previous mark |
| cao | correct answer only |
| sc | special case |
| indep | independent |

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Paper 1

| Question | Answer | Mark | Comments |
|----------|--|------|---|
| 1 (a) | 6 | B1 | |
| 1 (b) | 27 | B1 | |
| 1 (c) | 35 | B1 | |
| 2 | 16 | B1 | |
| 3 | $2x + 8$ | B1 | |
| 4 (a) | Triangular prism | B1 | |
| 4 (b) | Six vertices and 9 edges ticked | B1 | With no other boxes ticked |
| 5 | $\frac{11}{4}$ | B1 | |
| 6 | $125 : 75$ | M1 | |
| | $5 : 3$ | A1 | |
| 7 (a) | 13 | B1 | |
| 7 (b) | $3n$ seen Or show that the sequence is going up in 3's | M1 | |
| | $3n + 1$ Or $\times 3$ then $+ 1$ implied | M1 | |
| | 151 | A1 | cao |
| | | | |
| 8 | 64 '–15' then $\sqrt{\quad}$ attempted | M1 | In the correct order |
| | 7 | A1 | Accept –7 |
| 9 | $40 \div 3$ or 13 seen | M1 | |
| | 1.25×13 | M1 | Must attempt a partition method |
| | 16.25 | B1 | cao |
| | £16.73 | A1 | scB1 for £17.50 (with no other method marks seen) |
| 10 (a) | $468 \div 4$ | M1 | Accept $\frac{1}{4}$ of 468 |
| | 117 | A1 | |
| 10 (b) | $360^\circ - 90^\circ - 120^\circ - 78^\circ (= 72^\circ)$ | M1 | |
| | $\frac{72}{360} \times 100$ | M1 | oe |
| | 20% | A1 | |
| 11 (a) | $x = 15$ | A1 | |
| 11 (b) | $3x \leq 4 + 5$ | M1 | |
| | $x \leq 3$ | A1 | scB1 for answer of 3 if M0 |
| 11 (c) | 4 or x^3 seen | M1 | |
| | $4x^3$ | A1 | cao |

| Question | Answer | Mark | Comments |
|----------|---|-------|--|
| 12 (a) | 23 | B1 | |
| 12 (b) | $139 - 93$ | M1 | |
| | 46 | A1 | |
| 12 (c) | An attempt to order the middle row or find the '12th' value | M1 | |
| | 113 | A1 | |
| 13 (a) | Answer in range $125^\circ - 130^\circ$ | B1 | |
| 13 (b) | Answer in range 1.65 – 1.85 km | B1 | |
| 13 (c) | Bearing of 290° drawn | B1 | |
| | Point D marked exactly 4.4 cm from T | B1 | Point D must be on bearing of 290° for 2 marks |
| 14 | $120 \div 5 \times 2 (= 48)$ | M1 | |
| | '120' – '48' (= 72) | M1dep | |
| | '72' $\div [4 + 5] (= 8)$ | M1dep | |
| | 40 mins | A1 | |
| 15 (a) | $50 \times (60 \div 6)$ (= 500) $50 \div 6 \approx 8$ | M1 | |
| | $500 \times 8 = 4000$ or $500 \times 20 = 10000$ or $500 \times 24 = 12000$ '8' $\times 60 \times 8 = 480 \times 8$; $500 \times 8 = 4000$ or '8' $\times 60 \times 24 = 480 \times 24$; $500 \times 20 = 10000$ or '8' $\times 60 \times 8 = 480 \times 24$; $500 \times 25 = 12500$ | A1 | This answer mark will be affected by the assumption made in part (b) |
| 15 (b) | An assumption supports their method in part (a) e.g. 'the machine operates for 8 hours per day' or 'the machine operates for 24 hours a day' | B1 | |

| Question | Answer | Mark | Comments |
|-------------------------------|---|-----------|--|
| 16 (a) Alt 1 | $\frac{3}{25} > \frac{1}{10} > \frac{4}{50}$ | B1 | |
| | Benjamin | C1 dep | |
| 16 (a) Alt 2 | 'Because they each did different numbers of trials' | B1 | Accept similar statement |
| | 'I can't tell' | B1 dep | Accept similar statement |
| 16 (b) | Josue | B1 | |
| | He did the most trials | B1 | Accept similar statement |
| 17 (a) | $\frac{6}{15} + \frac{5}{15}$ | M1 | oe, allow one error in the numerators |
| | $\frac{11}{15}$ | A1 | |
| 17 (b) | $\frac{9 \times 1}{2 \times 6}$ | M1 | |
| | $\frac{3}{4}$ | A1 | oe |
| 18 (a) | 30 seconds | B1 | |
| 18 (b) | $\frac{1200}{5}$ or $\frac{1.2}{5}$ | M1 | |
| | 4 m/s | A1 | |
| 18 (c) | $\frac{1200}{6} \div 60$ (= 3.33... mins) | M1 | |
| | 3 mins 20 seconds | B1 | |
| | Straight line drawn from (6, 1.2) to a point marked on the x axis between 9 and 9.5 | A1 | Point must be > 9 |
| 19 | $4x$ or $x + 12$ seen | M1 | Accept other letters used instead of ' x ' |
| | $x + 4x = x + 12$ | M1 | |
| | 3 | A1 | Trial and error scores zero unless final answer is correct |

| Question | Answer | Mark | Comments |
|---------------|--|-------|---|
| 20 | $320\pi \div 20 (=16\pi)$ | M1 | Allow $320 \div 20$ |
| | $\sqrt{16}$ (= 4) | M1 | |
| | '4' $\times 2$ | M1 | |
| | 8 cm | A1 | cao |
| 21 (a) | 96 000 000 | B1 | Accept 96 million |
| 21 (b) | 5 in the correct order | B1 | |
| | France, UK, Egypt, Japan, US, China | B1 | Fully correct |
| 21 (c) | 65 500 000 or 6.55×10^7 | B1 | In the 1st position |
| | 66 500 000 or 6.65×10^7 | B1 | In the 2nd position |
| 22 | 100 (mins) = 80% or $(100 \div 80) \times 100$ | M1 | Allow any correct % equivalent e.g. 50 (mins) = 40% |
| | 125 minutes | A1 | cao |
| 23 (a) | $\sin 30^\circ = \frac{1}{2}$ | B1 | oe |
| 23 (b) | $\sin 30^\circ = \frac{x}{5}$ | M1 | |
| | $\frac{1}{2} \times 5$ | M1 ft | Allow ft from part (a) |
| | 2.5 cm | A1 | oe |
| 24 | $5^{-1} = \frac{1}{5}$ or $1 - 5^{-1}$ | M1 | |
| | $\frac{4}{5}$ | A1 | |

Paper 2

| Question | Answer | Mark | Comments |
|--------------|-------------------------------|------|---------------|
| 1 | 2.4 | B1 | |
| 2 (a) | 2340g | B1 | |
| 2 (b) | 640 cm | B1 | |
| 3 (a) | $2x - 2y$ | B1 | |
| 3 (b) | $12a$ | B1 | |
| 4 | Regular | B1 | |
| | Hexagon | B1 | |
| 5 | $4 + 6 + 3 + 1 + 7$ (= 21) | M1 | Allow 1 error |
| | 3 | A1 | |

| Question | Answer | Mark | Comments |
|---------------|---|-------|---|
| 6 | (-1, 2.5) | B2 | oe, 1 mark for each |
| 7 (a) | $(36 \div 5) \times 3$ or $(36 \div 5) \times 2$ | M1 | |
| | £14.40 | A1 | |
| 7 (b) | $\frac{16}{36}$ (= 0.444...) or $\frac{20}{36}$ (= 0.555...) | M1 | |
| | $\frac{20}{36} \times 100$ | M1 | |
| | 55.6% or 56% | A1 | Allow correct rounding of 2 significant figures or better |
| | | | |
| 8 | 51.84 or 4.828... seen | M1 | |
| | 10.73641... | A1 | |
| 9 (a) | Primary and continuous | B1 | With no other boxes ticked |
| 9 (b) | Ensure each student is equally likely to be picked, e.g. names in a hat | C1 | Either a statement or example is acceptable |
| 10 (a) | $2 + 12 - 8$ (=6) | M1 | |
| | No, it equals 6 | A1dep | |
| 10 (b) | $2 + 3 \times (4 - 8)$ or $2 + -12 = -10$ | B1 | |
| 11 | At least 2 prime factors found, e.g. $2250 = 2 \times 1125$ and $1125 = 5 \times 225$ | M1 | |
| | $a = 2$ and $b = 3$ | A1 | |
| 12 | 9:31 pm | B1 | |
| 13 (a) | 13 in the eggs circle | B1 | |
| | 10 outside the circles | A1ft | Allow a ft mark for a correct answer leading from a correct method using their '13' |
| 13 (b) | $\frac{10}{50}$ | M1ft | Allow ft from part (a) |
| | $\frac{10}{50}$ or $\frac{1}{5}$ | A1 | oe |

| Question | Answer | Mark | Comments |
|---------------|---|------|---|
| 14 | All numbers correctly converted to decimals or percentages e.g. 0.42..., 0.41, 0.385, 0.4 | M1 | |
| | 38.5%, $\frac{1}{2}$ of $\frac{4}{5}$, 0.41, $\frac{3}{7}$ | A1 | |
| 15 | $\frac{3}{5} : 1$ or $\frac{6}{5}$ seen | M1 | oe |
| | $\frac{3}{5} : 1 : \frac{6}{5}$ | M1 | oe |
| | 3 : 5 : 6 | A1 | |
| 16 | Any factor pair with their product in the centre | M1 | |
| | Any 2 factor pairs, with correct centre | M1 | |
| | 56 in the centre with 2 and 28, 4 and 14, 7 and 8 | A1 | Other centre values will work e.g 84, 112, etc. |
| 17 | $2 \times 100 \times 100$ | M1 | |
| | 20 000 cm ² | A1 | |
| 18 (a) | $4(x^2 - 3x)$ or $x(4x - 12)$ | M1 | |
| | $4x(x - 3)$ | A1 | |
| 18 (b) | $x - 3 < 8$ or $x < 11$ | M1 | |
| | $x = 10$ | A1 | |
| 19 (a) | $9^2 - 2 \times 9$ (= 63) | M1 | |
| | $180 - 2 \times '63'$ | M1 | |
| | $y = 54^\circ$ | A1 | |
| 19 (b) | $z = 63^\circ$ | B1ft | allow follow through from their ' $x^2 - 2x$ ' |
| | Alternate angles are equal OR co-interior angles sum to 180° | C1 | |

| Question | Answer | Mark | Comments |
|-----------|---|-------|--|
| 20 | Arcs from light house and cliffs intersecting and a straight line drawn through the two intersection points | B1 | |
| | A circle with radius 2.5 cm drawn around the yacht | B1 | Accept an arc which intersects with their perpendicular bisector |
| | A cross marked at the intersection of the circle and the perpendicular bisector | B1 | |
| 21 | $1.5 \times 0.5 (= 0.75\text{m}^2)$ | M1 | Accept $150 \times 50 = 7500\text{cm}^2$ |
| | $\frac{3000}{0.75}$ | M1dep | |
| | 4000 N/m^2 | A1 | |
| 22 | 215 cm or 2.15 m seen Or correct method to find m per worker e.g. $10.75 \div 5$ | M1 | |
| | 2.15×7 | M1 | |
| | 15.05 m | A1 | |
| | | | |
| 23 | 8π | B1 | |
| 24 | 42, 84, 126, ... and 70, 140, 210, ... | M1 | Allow errors if intention is clear |
| | 210 identified | M1 | Or a multiple of 210 |
| | $x = 5$ and $y = 3$ | A1 | Or multiples of 5 and 3 |
| 25 | Any translation | B1 | The shape should be exactly the same size and orientation |
| | Fully correct translation Top right corner should be the point (4, 4) | B1 | |

| Question | Answer | Mark | Comments | | | | | | | | |
|-------------------------------|--|--|-------------------------------|---|---|---|----|---|---|----|--|
| 26 | 180 000 ÷ 1.18 Or 180 000 ÷ 1.06 | M1 | | | | | | | | | |
| | 180 000 ÷ 1.18 ÷ 1.06 (= 143 907) | M1 | | | | | | | | | |
| | £144 000 | A1 | | | | | | | | | |
| 27 | 161 × 20 (= 3220) | M1 | | | | | | | | | |
| | 145 × 3 + 155 × 6 + 165 × 6 + 175 × 4 (= 3055) | M1 | | | | | | | | | |
| | 3220 – 3055 (= 165) | M1dep | | | | | | | | | |
| | 160 < h ≤ 170 should have frequency = 7 | A1dep | Zero marks with no working | | | | | | | | |
| 28 (a) | $y = \frac{5x}{3} + 1$ | M1 | | | | | | | | | |
| | <table border="1"><tr><td>x</td><td>–3</td><td>0</td><td>3</td></tr><tr><td>y</td><td>–4</td><td>1</td><td>6</td></tr></table> | x | –3 | 0 | 3 | y | –4 | 1 | 6 | M1 | At least one of these points correctly plotted |
| | x | –3 | 0 | 3 | | | | | | | |
| | y | –4 | 1 | 6 | | | | | | | |
| Fully correct line plotted | B1 | | | | | | | | | | |
| x = 1.5, y = 3.5 | A1 | scB1 if correct answer with no graph drawn | | | | | | | | | |
| 28 (b) | y = –x + c | M1 | Allow gradient = –1 | | | | | | | | |
| | x + y = 7 | A1 | oe | | | | | | | | |
| 29 (a) | 12 to 12.30 am | B1 | | | | | | | | | |
| 29 (b) | Tangent drawn on the graph at 10.30 pm | M1 | | | | | | | | | |
| | Answer in range 1.1–1.4 (cm/h) | A1 | | | | | | | | | |

Paper 3

| Question | Answer | Mark | Comments |
|--------------|-------------------------------|------|---------------------------|
| 1 | 9 tenths | B1 | |
| 2 | First diagram circled | B1 | |
| 3 (a) | Isosceles | B1 | |
| 3 (b) | 65° | B1 | |
| 4 | 1.03, 1.095, 1.3, 1.303, 1.33 | M1 | Any four in correct order |
| | Fully correct | A1 | |
| 5 | $36 - (11 + 10 + 7) [= 8]$ | M1 | |
| | $'8' \div 2 [= 4]$ | M1 | |
| | Last 2 bars with heights of 4 | A1 | |

| Question | Answer | Mark | Comments |
|---------------|--|------|---|
| 6 (a) | (-2, 4) | B1 | |
| 6 (b) | 7 cm identified as base of the rectangle | M1 | Could be implied by correct diagram drawn |
| | (5, 4) and (5, 1) in either order | A1 | Accept (-9, 4) and (-9, 1) |
| 6 (c) | $2 \times 3 + 2 \times '7'$ | M1ft | Where '7' is the base of their rectangle |
| | 20 cm | A1 | cao |
| 7 (a) | 48 | A1 | |
| 7 (b) | No with 96 and 192 seen | A1 | |
| 8 | Vertical line drawn up from H, then horizontal line drawn left from the top of the vertical line | M1 | |
| | South East | A1 | Allow correct bearing 135° |
| 9 (a) | 1.5 | A1 | |
| 9 (b) | 9.261 | A1 | |
| 9 (c) | 1024 | A1 | |
| 10 | Lists at least 4 factors of 40 | M1 | |
| | 2 or 5 identified as prime Or 1 or 8 identified as a cube number | M1 | |
| | 8 | A1 | |
| 11 (a) | 31 | A1 | |
| 11 (b) | $\sqrt{(59+5)}$ | A1 | |
| | 8 | | |
| 12 | False | B1 | |
| | True | B1 | |
| | Sometimes true | B1 | |
| | True | B1 | |

| Question | Answer | Mark | Comments |
|---------------|--|-------|-------------------------------------|
| 13 | $2 \times 10.85 (= 21.70)$ | M1 | A4 print is free |
| | $21.70 - (2 \times 3.09 + 1.52 + 3.80)$ [= 10.20] | M1 | Allow 30.35 in place of 21.70 |
| | $2 \times 5.95 - (2 \times 1.07 + 3.80)$ [= 5.96] | M1 | |
| | $8.65 - (1.52 + 2.40)$ [= 4.73] | M1 | |
| | '10.20' + '5.96' + '4.73' | M1dep | |
| | £20.89 | A1 | cao |
| 14 | £125 | B1 | |
| 15 | $\begin{array}{r} 30 \quad 13 \\ 51 \quad 17 \\ 21 \quad 15 \\ \quad 6 \end{array}$ | M1 | At least 3 out of 6 numbers correct |
| | Fully correct diagram | A1 | |
| 16 (a) | 584×0.188 [= 110] | M1 | |
| | $\begin{array}{r} 584 - 312 - 110 \\ \hline 584 \\ \text{or } \frac{162}{584} \end{array}$ | M1dep | |
| | $\frac{81}{292}$ | A1 | cao |
| 16 (b) | $312 + 30 - 12$ [= 330] Or $584 + 11 + 30 + 6 - 10 - 12 - 7$ [= 602] | M1 | |
| | $\frac{330}{602} \times 100$ | M1dep | |
| | 55% | A1 | or better (54.817....)% |
| 17 | Complete method seen e.g. $\frac{19}{5} \times \frac{4}{3}$ | M1 | oe |
| | $\frac{76}{15}$ | A1 | |
| | $5\frac{1}{15}$ inches | B1 | |

| Question | Answer | Mark | Comments |
|---------------|---|-------|----------------------------------|
| 18 (a) | At least 8 points plotted correctly | B1 | Allow ± 1 sq accuracy |
| 18 (b) | No correlation | B1 | |
| | Correct interpretation e.g. 'there is no connection between height and salary earned' | C1 | |
| 19 | $\frac{26-19}{26} \times 100$ | M1 | |
| | 26.9 % | A1 | Allow 27% |
| 20 (a) | €560 | B1 | Allow €550 to €560 |
| 20 (b) | Uses the graph to find 300 euros \approx £270 | M1 | Allow £260 to £280 |
| | '270' \times 1990 | M1dep | Converts any amount of £s to LBP |
| | Answer in the range (517 400 to 557 200) LBP | A1 | |
| 21 | (exterior angle $=$) $180-2x$ | M1 | |
| | $\frac{360}{180-2x}$ | M1 | |
| | $\frac{180}{90-x}$ | A1 | |
| 22 | 6.25 cm | B1 | |
| 23 | 2500 ml or 0.5 litres seen | M1 | |
| | $2500 \times (0.965)^n$ | M1 | Any positive value of n tried |
| | 7 mins | A1 | |

| Question | Answer | Mark | Comments |
|---------------|--|-------|----------|
| 24 | $3 \times 4 \times 7$ (= 84 cm ³) | M1 | |
| | $\frac{1}{3} \times \pi \times 3^2 \times 5$ | M1 | |
| | 15π or 47.123... (cm ³) | M1 | |
| | $\frac{661}{84}$ or $\frac{557}{55}$ or $\frac{336}{15\pi}$ | M1dep | |
| | $\frac{661}{84}$ and $\frac{557}{55}$ and $\frac{336}{15\pi}$ | M1dep | |
| | At least one of 7.869... or 10.127... or 7.13... | A1 | |
| | Zinc, iron, copper, silver and 7.8..., and 10.1..., and 7.1... seen | C1dep | |
| 25 (a) | $(x \pm 3)(x \pm 2)$ | M1 | |
| | $(x + 3)(x - 2)$ | A1 | |
| 25 (b) | 0, -6 and -6 in the table | M1 | |
| | At least 6 points plotted correctly from (-3, '0'), (-2, -4), (-1, ' -6'), (0, ' -6'), (1, -4), (2, 0), (3, 6) | M1 | |
| | fully correct graph joined with a smooth curve | A1 | |
| 26 (a) | 0.2 on the 1 st tail branch | B1 | |
| | 0.8, 0.2, 0.8 and 0.2 on the 2 nd flip | B1 | |
| 26 (b) | $0.8 \times '0.8'$ | M1ft | |
| | 0.64 | A1 | oe |