

Edexcel GCSE

Mathematics 2381

Summer 2009

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Mark Scheme (Results)

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| 5381F/5A | | | | |
|----------|---------|---|------|---|
| Question | Working | Answer | Mark | Notes |
| 1 (a) | | 35 | 1 | B1 cao |
| (b) | | Warmer in Majorca Increase in temperature from Jan to Jun | 2 | B2 for two acceptable comparisons/observations [B1 for one comparisons/observation] |
| 2 (a) | 16 - 3 | 13 | 2 | M1 for 16 - 3 A1 cao [3 to 16, 3 - 16 oe gets B1 if M0 scored] |
| (b) | | 9 | 1 | B1 cao (take care that this is not the result of an attempt to find the mean) |
| (c) | | 10 | 1 | B1 cao (take care that this is not the result of an attempt to find the mean) |
| 3 (a)(i) | | $\frac{90}{360}$ oe | 1 | B1 for $\frac{90}{360}$ oe (accept 25% or 0.25 or $\frac{1}{4}$) Condone any incorrect cancelling if correct answer is seen Do not accept 1:4 or 4:1 or 1 out of 4 or 3 in 4 etc |
| (ii) | | $\frac{270}{360}$ oe | 1 | B1 for $\frac{270}{360}$ oe (accept 75% or 0.75 or $\frac{3}{4}$) Condone any incorrect cancelling if correct answer is seen Do not accept 3:4 or 4:3 or 3 out of 4 or 3 in 4 etc SC: B1 for 1 - (a)(i) SC: B0 in (i) and B1 in (ii) for correct answers but consistent writing of probabilities incorrectly in BOTH parts (a)(i) and (a)(ii) e.g. 1 out of 4 and 3 out of 4 |

| 5381F/5A | | | | |
|----------|--|--------|------|--|
| Question | Working | Answer | Mark | Notes |
| (b) | $(360 \div 30) \times 6$ | 72 | 2 | M1 for $360 \div 30$ o.e. e.g. 30° is a twelfth or $6 \div 30$ or $30 \div 6$ or 1 person is 5° o.e. or sight of 12×6 or $360 \div 5$ or attempt add 5 frequencies 3 of which are correct or any partial equivalent method A1 cao |
| 4 (a) | | 15 | 1 | B1 cao |
| (b) | $(1 \times 11 + 3 \times 12 + 0 \times 13$ $+ 2 \times 14 + 4 \times 15) \div 10$ $= 135 \div 10$ $= 11 + 36 + 0 + 28 + 60$ | 13.5 | 3 | M1 for 1×11 or 3×12 or 0×13 or 2×14 or 4×15 or sight of any two or more of the correct answers 11, 36, 0, 28, 60 (must be from a product however) M1 (dep) for adding 4 or 5 of these products and dividing by 10 A1 cao [SC: B2 available for using ' $13 \times 0 = 13$ ' without further mistakes] giving an answer of 14.8 |

| 5381F/5B | | | | | | | | | | |
|----------|---------|---|------|--|-----------|--|--|--|---|---|
| Question | Working | Answer | Mark | Notes | | | | | | |
| 1 (a) | | 3 | 1 | B1 cao | | | | | | |
| (b) | | Estate | 1 | B1 cao | | | | | | |
| (c) | | $\frac{2}{4}$ oe | 2 | M1 for a fraction with a denominator of 4 or numerator of 2 A1 for $\frac{2}{4}$ oe (accept 0.5 or 50%) SC B1 for 2 out of 4 or 1 out of 2 B0 for 1 : 2 or 2 : 4 or 4 : 2 etc | | | | | | |
| 2 (a) | | Between $\frac{1}{4}$ and $\frac{1}{2}$ but nearer to $\frac{1}{2}$ | 1 | B1 for a mark between $\frac{1}{4}$ and $\frac{1}{2}$ but nearer to $\frac{1}{2}$ than $\frac{1}{4}$ | | | | | | |
| (b) | | At 0 | 1 | B1 for a clear mark at 0 within ± 2 mm | | | | | | |
| 3 | | <table border="1"> <thead> <tr> <th>Type</th> <th>Tally</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Type | Tally | Frequency | | | | 3 | B1 for Type of newspaper (or listing examples) B1 for Tally (or tally marks shown) B1 for Frequency (or Total or evidence of totalling) |
| Type | Tally | Frequency | | | | | | | | |
| | | | | | | | | | | |
| 4 (a) | | Positive correlation, or the heavier the pike the longer it is. | 1 | B1 for positive correlation, or the heavier the pike the longer it is. (or equivalent) B0 for positive (relationship) | | | | | | |
| (b) | | Point plotted correctly | 1 | B1 for a correct plot ± 1 square | | | | | | |
| (c) | | 12-17 kg | 2 | B2 for an answer in the range 12 to 17 kg inclusive OR M1 for drawing a line of best fit or vertical line drawn from 65 cm A1 for an answer in the range 12 to 17 kg or ft from "line of best fit" | | | | | | |

| 5381F/5B | | | | |
|----------|---------|--|------|---|
| Question | Working | Answer | Mark | Notes |
| 5 | | (g,1) (g,2) (g,3) (g,4) (g,5) (g,6) (b,1) (b,2)(b,3) (b,4) (b,5) (b,6) (r,1) (r,2) (r,3) (r,4) (r,5) (r,6) | 2 | B2 for a fully correct list [B1 for at least 6 correct additional outcomes] Ignore duplicates e.g. (g,1) (1, g) |

| 5381H/6A | | | | | |
|----------|---|--------------------------|------|---|--|
| Question | Working | Answer | Mark | Notes | |
| 1 | $(1 \times 11 + 3 \times 12 + 0 \times 13 + 2 \times 14 + 4 \times 15) \div 10$ $= 135 \div 10$ $= 11 + 36 + 0 + 28 + 60$ | 13.5 | 3 | M1 for 1×11 or 3×12 or 0×13 or 2×14 or 4×15 or sight of any two or more of the correct answers 11, 36, 0, 28, 60 (must be from a product however) M1 (dep) for adding 4 or 5 of these products and dividing by 10 A1 cao [SC: B2 available for using ' $13 \times 0 = 13$ ' without further mistakes] giving an answer of 14.8 | |
| 2 | (a) | $1 - (0.35 + 0.1 + 0.3)$ | 0.25 | 2 | M1 for $1 - (0.35 + 0.1 + 0.3)$ oe A1 for 0.25 oe (accept 25%) Note:- Look for answer in the table if it's not on answer line [SC: B1 for $1 - 0.39 = 0.61$, if M0 scored; 0.61 with no working gets no marks] |
| | (b) | $0.35 + 0.1$ | 0.45 | 2 | M1 for $0.35 + 0.1$ oe A1 for 0.45 oe [SC: B1 for an answer of 0.36 or for 0.45 seen in working followed by subtraction from 1] |
| | (c) | 0.3×200 | 60 | 2 | M1 for 0.3×200 A1 cao SC: B2 for 60 out of 200 SC: B1 for 60 in 200 or $60/200$ or $0.3 \times 200/4$ |

| 5381H/6A | | | | |
|----------|-----------------------|--|------|--|
| Question | Working | Answer | Mark | Notes |
| 3 (a) | $(623+640+639)\div 3$ | 634 | 2 | M1 for either $(623+640+639)\div 3$ or $(608+595+597)\div 3$ or $(595+597+623)\div 3$ or $(597+623+640)\div 3$ seen with no other inconsistent approach A1 cao |
| (b) | | Increase (upwards) | 1 | B1 for increase or upwards trend or 'number of births went up' or 'it goes up' oe |
| 4 | | Bars at 4cm, 6cm, 7cm, 8 cm and 1.5 cm in height oe with fd axis labeled correctly | 3 | M1 for dividing frequency by group size or sight of 0.8, 1.2, 1.4, 1.6, 0.3 (minimum 2 seen) A1 for bars of consistent areas for all given frequencies B1 for fd axis labeled correctly and consistently Alternative scheme B3 for bars at 4cm, 6cm, 7cm, 8 cm and 1.5 cm in height oe with fd axis labeled correctly and consistently (e.g. 1 cm fd 0.2) [B2 for bars at 4cm, 6cm, 7cm, 8cm and 1.5cm in height oe with no labeling or incorrect labeling on the fd axis OR fully and correctly labeled fd axis with one bar error] [B1 for 4 th bar twice as high as 1 st bar] [B0 for bar chart with unequal bars] NB apply the same mark-scheme if a different frequency density is used e.g. bars at 1.6 cm, 2.4 cm, 2.8 cm, 3.2 cm, 0.6 cm |

| 5381H/6B | | | | |
|----------|---------|---|------|---|
| Question | Working | Answer | Mark | Notes |
| 1 | (a) | Positive correlation, or the heavier the pike the longer it is. | 1 | B1 for positive correlation, or the heavier the pike the longer it is. (or equivalent) |
| | (b) | Point plotted correctly | 1 | B1 for a correct plot ± 1 square |
| | (c) | 12-17 kg | 2 | B2 for an answer in the range 12 to 17 kg OR M1 for drawing a line of best fit A1 for an answer in the range 12 to 17 kg or ft from "line of best fit" |
| 2 | (a) | $0.25 < p \leq 0.50$ | 1 | B1 for $0.25 < p \leq 0.50$ (accept 0.25 to 0.5(0) or clearly identified on the diagram as the mode) |
| | (b) | $0.5 < n \leq 0.75$ | 1 | B1 for $0.5 < n \leq 0.75$ (accept 0.5(0) to 0.75 or clearly identified on the diagram as the median) |
| | (c) | 4, 13, 17, 22, 28, 29, 30 | 1 | B1 cao |
| | (d) | cf graph | 2 | B2 for a fully correct cf graph (accept ogive) [B1 for 5 or 6 consistent, correctly plotted points from a sensible cf table (increasing values) OR for a cf graph drawn through points other than the end points of each interval] |
| | (e) | 9 or 10 or 11 | 2 | M1 for clear method to read off from a cf graph at area = 0.90, on the cf scale, can be awarded from their reading ± 1 sq A1 ft for an answer of 9 or 10 or 11 [B1 for an answer in the range 9 to 11 if M0 scored] |

| 5381H/6B | | | | |
|----------|---|--------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 3 | $\left(\frac{4}{9} \times \frac{3}{8}\right) + \left(\frac{3}{9} \times \frac{2}{8}\right) + \left(\frac{2}{9} \times \frac{1}{8}\right)$ $= \frac{12+6+2}{72}$ | $\frac{20}{72}$ oe | 4 | <p>B1 for $\frac{3}{8}$ or $\frac{2}{8}$ or $\frac{1}{8}$ seen as 2nd probability</p> <p>M1 for $\left(\frac{4}{9} \times \frac{3}{8}\right)$ or $\left(\frac{3}{9} \times \frac{2}{8}\right)$ or $\left(\frac{2}{9} \times \frac{1}{8}\right)$</p> <p>M1 for $\left(\frac{4}{9} \times \frac{3}{8}\right) + \left(\frac{3}{9} \times \frac{2}{8}\right) + \left(\frac{2}{9} \times \frac{1}{8}\right)$</p> <p>A1 for $\frac{20}{72}$ oe</p> <p>Alternative scheme for replacement</p> <p>B0 for $\frac{4}{9}$ or $\frac{3}{9}$ or $\frac{2}{9}$ seen as 2nd probability</p> <p>M1 for $\left(\frac{4}{9} \times \frac{4}{9}\right)$ or $\left(\frac{3}{9} \times \frac{3}{9}\right)$ or $\left(\frac{2}{9} \times \frac{2}{9}\right)$</p> <p>M1 for $\left(\frac{4}{9} \times \frac{4}{9}\right) + \left(\frac{3}{9} \times \frac{3}{9}\right) + \left(\frac{2}{9} \times \frac{2}{9}\right)$</p> <p>A0 for $\frac{29}{81}$</p> <p>Special cases</p> <p>S.C. if M0 scored, award B2 for $\frac{29}{81}$ or $\frac{20}{81}$ or $\frac{29}{72}$</p> <p>S.C. if M0 scored award B1 for $\frac{3}{9}$ and $\frac{2}{9}$ and $\frac{1}{9}$</p> <p>or $\frac{3}{8}$ and $\frac{2}{8}$ and $\frac{1}{8}$ seen as second probability if B2 not scored</p> |

UNIT 2 STAGE 1

5382F

PAPER 07

| | | | | | | | | | | |
|----------|----|----|----|----|----|----|----|----|----|----|
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Answer | A | A | E | C | C | D | B | C | B | C |
| Question | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Answer | D | D | B | C | A | B | C | D | D | D |
| Question | 21 | 22 | 23 | 24 | 25 | | | | | |
| Answer | E | D | E | A | B | | | | | |

UNIT 2 STAGE 1

5382H

PAPER 08

| | | | | | | | | | | |
|----------|----|----|----|----|----|----|----|----|----|----|
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Answer | D | E | E | A | D | B | E | A | D | A |
| Question | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Answer | E | B | D | A | A | E | A | E | D | B |
| Question | 21 | 22 | 23 | 24 | 25 | | | | | |
| Answer | E | A | A | E | E | | | | | |

| 5383F/09 | | | | |
|----------|-------------------------------|------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 1 (a) | | 25 | 1 | B1 for 25 cao |
| (b) | | 0.2 | 1 | B1 for 0.2 cao |
| (c) | | $\frac{27}{100}$ | 1 | B1 for $\frac{27}{100}$ cao |
| 2 | | 12 | 2 | B2 for 12 cao (B1 for 10 or 11) |
| 3 | | Diameter drawn | 1 | B1 for a diameter drawn |
| 4 (a) | | 14 | 1 | B1 for 14 cao |
| (b) | $7 \times 7 \times 7$ | 343 | 1 | B1 for 343 cao |
| 5 (a) | | $3m$ | 1 | B1 for $3m$ (accept m^3) |
| (b) | | y^2 | 1 | B1 for y^2 cao |
| (c) | | $5a + b$ | 2 | B2 for $5a + b$ cao (B1 for $5a$ or b or $1b$) |
| 6 | $\frac{35}{100} \times 240 =$ | 84 | 2 | M1 for $\frac{35}{100} \times 240$ or 0.35×240 or 35×2.4 or $24 + 24 + 24 + 12$ or for any complete method. A1 for 84 cao |

| 5383F/09 | | | | | | | | | | | | | | | | | |
|----------|--|----|--------|------|---|---|---|---|---|----|----|---|---|---|---------------|---|---|
| Question | Working | | Answer | Mark | Notes | | | | | | | | | | | | |
| 7 (a) | 180 - 2×52 = | | 76 | 2 | M1 for 180 - '2×52' A1 for 76 cao | | | | | | | | | | | | |
| (b) | | | reason | 1 | B1 for isosceles or angles in a triangle sum to 180° | | | | | | | | | | | | |
| 8 | <table border="1"> <tr> <td>x</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>y</td> <td>-5</td> <td>-2</td> <td>1</td> <td>4</td> <td>7</td> </tr> </table> | | x | -1 | 0 | 1 | 2 | 3 | y | -5 | -2 | 1 | 4 | 7 | Straight line | 3 | M2 for two correct points plotted or a correct straight line which does not cover the range $x = -1$ to $x = 3$ (M1 for one point correctly plotted or calculated or a straight line through one correct point) A1 for correct line between -1 and 3 OR M1 for line with correct gradient M1 for line with correct y intercept A1 for correct line between -1 and 3 |
| x | -1 | 0 | 1 | 2 | 3 | | | | | | | | | | | | |
| y | -5 | -2 | 1 | 4 | 7 | | | | | | | | | | | | |
| 9 | $3.4^2 - 2.6^2 = 4.8$ $4.8 \div 1.6 =$ | | 3 | 2 | M1 for $3.4 \times 3.4 - 2.6 \times 2.6$ with evidence of multiplication or 11.56 or 6.76 or 4.8 or 289/25 or 169/25 or 24/5 A1 for 3 cao (SC B1 for 7.335 or 1467/200) | | | | | | | | | | | | |

| 5383F/09 | | | | |
|----------|---|--------|------|--|
| Question | Working | Answer | Mark | Notes |
| 10 | $\frac{30}{1.5} = 20$ $\frac{42}{2} = 21$ | Kamala | 3 | <p>M1 for $\frac{30}{1.5}$ or $\frac{42}{2}$ (accept minutes) A1 for 20 and 21 A1 for Kamala cao Note: answer only scores M0 A0 A0</p> <p>Alternative method: M1 for 10 km in 0.5 hours A1 for 40 km in 2 hours A1 for Kamala cao</p> <p>OR</p> <p>M1 for 10.5 km in 0.5 hours A1 for 31.5 km in 1.5 hours A1 for Kamala cao</p> <p>OR</p> <p>M1 for 60 km in 3 hours or 63 km in 3 hours A1 for 60 km in 3 hours and 63 km in 3 hours A1 for Kamala cao</p> <p>OR</p> <p>M1 for 10 km in 30 minutes or 10.5 km in 30 minutes A1 for 60 km in 30 minutes and 10.5 km in 30 minutes A1 for Kamala cao</p> |

| 5383H/10 | | | | | | | | | | | | | | | | | |
|----------|--|----|--------------------|------|--|---|---|---|---|----|----|---|---|---|---------------|---|--|
| Question | Working | | Answer | Mark | Notes | | | | | | | | | | | | |
| 1 | $3.4^2 - 2.6^2 = 4.8$ $4.8 \div 1.6 =$ | | 3 | 2 | M1 for $3.4 \times 3.4 - 2.6 \times 2.6$ with evidence of multiplication or 11.56 or 6.76 or 4.8 or 289/25 or 169/25 or 24/5 A1 for 3 cao (SC B1 for 7.335 or 1467/200) | | | | | | | | | | | | |
| 2 (a) | | | 50 | 1 | B1 for 50 cao | | | | | | | | | | | | |
| (b) | | | Alternate (angles) | 1 | B1 for alternate (angles) or co-interior (angles) or allied (angles) or any complete reason. (accept Z angles) | | | | | | | | | | | | |
| 3 | <table border="1"> <tr> <td>x</td> <td>-1</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>y</td> <td>-5</td> <td>-2</td> <td>1</td> <td>4</td> <td>7</td> </tr> </table> | | x | -1 | 0 | 1 | 2 | 3 | y | -5 | -2 | 1 | 4 | 7 | Straight line | 3 | M2 for two correct points plotted or a correct straight line which does not cover the range $x = -1$ to $x = 3$ (M1 for one point correctly plotted or calculated or a straight line through one correct point) A1 for correct line between -1 and 3 OR M1 for line with correct gradient M1 for line with correct y intercept A1 for correct line between -1 and 3 |
| x | -1 | 0 | 1 | 2 | 3 | | | | | | | | | | | | |
| y | -5 | -2 | 1 | 4 | 7 | | | | | | | | | | | | |
| 4 | $18 \times 5.8 =$ | | 104.4 | 2 | M1 for 18×5.8 A1 for 104.4 cao | | | | | | | | | | | | |
| 5 (a) | $6x + 9 + 2x + 2 =$ | | $8x + 11$ | 2 | M1 for $3 \times 2x + 3 \times 3$ or $2 \times x + 2 \times 1$ or $6x + 9$ or $2x + 2$ or $8x$ or 11 A1 for $8x + 11$ cao | | | | | | | | | | | | |
| (b) | $y^2 + 4y - 3y - 12$ | | $y^2 + y - 12$ | 2 | M1 for 3 out of 4 terms of $y \times y + 4 \times y - 3 \times y - 3 \times 4$ correct including signs, or 4 terms excluding signs A1 for $y^2 + y - 12$ or $y^2 + 1y - 12$ cao | | | | | | | | | | | | |

| 5383H/10 | | | | |
|----------|---|------------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 6 | $\frac{1}{2}(180 - 86) = 47$ $90 - 47 =$ | 43 | 2 | M1 for $\frac{1}{2}(180 - 86)$ or 47 or for $90 - '47'$ or $\frac{1}{2}(180 - "94")$ A1 for 43 cao |
| 7 | | 1.5×10^3 | 2 | B2 for 1.5×10^3 cao (B1 for $a \times 10^3$, $a \neq 1.5$ or 1.5×10^b , $b \neq 3$ or 15×10^2 or 1500) |
| 8 | $x = 0.1717\dots$ $100x = 17.1717\dots$ $99x = 17$ $x = \frac{17}{99}$ or $1000x = 171.7171\dots$ $10x = 17.1717\dots$ $990x = 170$ $x = 17/99$ | Proof | 2 | M1 for valid method eg $100x = 17.17\dots$, $1x = 0.1717\dots$ and subtract OR $1000x = 171.7171\dots$, $10x = 17.1717\dots$ and subtract A1 for valid argument leading to $x = \frac{17}{99}$ Alternative method for long division M1 for identifying 71 and 17 as remainders A1 for correct statement |
| 9 | $\frac{\cancel{(x+1)}(2x+1)}{\cancel{(x+1)}(x-4)} =$ | $\frac{(2x+1)}{(x-4)}$ | 3 | B3 for $\frac{(2x+1)}{(x-4)}$ (B1 for $(x+1)(2x+1)$ and/or B1 for $(x+1)(x-4)$) |

| 5383H/10 | | | | |
|----------|--|----------------|------|---|
| Question | Working | Answer | Mark | Notes |
| 10 | Mass of water = $300 \times 1 = 300\text{g}$ Mass of juice = $15 \times 4 = 60\text{g}$ Total mass = 360 Total volume = 315 Density = $360 \div 315$ | $1\frac{1}{7}$ | 3 | M1 for 300×1 or 15×4 or 60 or 360 seen M1 for $\frac{'300 \times 1' + '15 \times 4'}{'300 + 15'}$ A1 for $1\frac{1}{7}$ oe or 1.14... |

| 5384F/11F | | | | |
|-----------|-------------------|----------|------|--|
| Question | Working | Answer | Mark | Notes |
| 1 | $30 - (16 + 9)$ | 5 | 2 | M1 $30 - "(16 + 9)"$ or $"30 - 16" - 9$ or $"30 - 9" - 16$ A1 cao |
| 2 | (a) | 207 | 2 | M1 for a valid method (condone one error) or sight of 7 (as units) in working or answer OR $'193 + 7' + 200$ or $'193 + 200' + 7$ A1 cao |
| | (b) | -5 | 1 | B1 cao |
| | (c) | -15 | 1 | B1 cao |
| | (d) | 6 | 1 | B1 cao |
| 3 | (a) | 30 | 1 | B1 for 30 |
| | (b) | 5 | 1 | B1 for 5 |
| 4 | $(27 + 3) \div 2$ | 17 15 | 3 | B1 for output 17 M1 for $(27 + 3) \div 2$ or $\leftarrow \div 2 \leftarrow + 3$ seen A1 for input 15 SC: B1 for input of 60 or 12 or 16.5 |
| 5 | (i) | E or C | 1 | B1 for E or C or both |
| | (ii) | B | 1 | B1 cao |
| | (iii) | A | 1 | B1 cao |
| | (iv) | C or A | 1 | B1 for C or A or both |

| 5384F/11F | | | | |
|-----------|---------|-----------|------|--|
| Question | Working | Answer | Mark | Notes |
| 6 | (a) | Edinburgh | 1 | B1 for Edinburgh or -7 |
| | (b) | 5 | 1 | B1 cao |
| | (c) | Leeds | 1 | B1 for Leeds or -6 to 3 or 9 or -9 |
| 7 | (a) | 6 | 1 | B1 cao |
| | (b) | 5 | 1 | B1 cao |
| | (c) | 7 | 1 | B1 cao |
| 8 | (a) | 08 30 | 1 | B1 for 08 30 oe |
| | (b) | 17 | 1 | B1 cao |
| | (c) | 10 15 | 1 | B1 for 10 15 oe |
| 9 | (a) | Diagram | 2 | B2 within guidelines |
| | (b) | 90 | 1 | B1 for an angle in range 86 to 94 or ft 'angle' measured correctly within $\pm 2^\circ$ |
| 10 | (a) | 45 | 1 | B1 for 44 - 46 |
| | (b) | 60 | 1 | B1 cao |
| | (c) | 150 | 2 | M1 for a complete method e.g. reading from graph at 50 euros and doubling (allow $\pm 1\text{mm}$ tolerance in reading from graph) A1 for 140 - 160 SC: B2 for 200 |

| 5384F/11F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--|---------------|------|---|--|----|-----|-----|-----|---|-----|----|-----|--|-----|-----|--|--|---|---|--|--|---|---|--|--|---|---|---|---|---|---|---|--|---|---|--|--|---|---|--|-----|---|---|
| Question | Working | Answer | Mark | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | $\frac{1}{8} + \frac{6}{8}$ | $\frac{7}{8}$ | 2 | M1 for $\frac{6}{8}$ OR correct attempt to make fractions have a common denominator with at least one fraction correct OR for 0.125 and 0.75 seen A1 for $\frac{7}{8}$ oe or 0.875 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | 4 | 2 | M1 for $\frac{20}{5}$ or $\frac{5}{20}$ or $\frac{12}{3}$ or $\frac{3}{12}$ OR 3×4 and 5×4 seen A1 cao SC: B1 for 4:1 or 1:4 oe | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | $20 \times 36 = 720$ $4 \times 36 = 144$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>30</td><td>6</td><td></td></tr> <tr><td>20</td><td>600</td><td>120</td><td>720</td></tr> <tr><td>4</td><td>120</td><td>24</td><td>144</td></tr> <tr><td></td><td>720</td><td>144</td><td></td></tr> </table> <table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td>3</td><td>6</td><td></td></tr> <tr><td></td><td>0</td><td>1</td><td></td></tr> <tr><td></td><td>6</td><td>2</td><td>2</td></tr> <tr><td>8</td><td>1</td><td>2</td><td>4</td></tr> <tr><td></td><td>2</td><td>4</td><td></td></tr> <tr><td></td><td>6</td><td>4</td><td></td></tr> </table> | | 30 | 6 | | 20 | 600 | 120 | 720 | 4 | 120 | 24 | 144 | | 720 | 144 | | | 3 | 6 | | | 0 | 1 | | | 6 | 2 | 2 | 8 | 1 | 2 | 4 | | 2 | 4 | | | 6 | 4 | | 864 | 3 | M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary. M1 (dep) for addition of the appropriate elements of the calculation. [Note: Repeated addition of 24 lots of 36 (36 lots of 24) gets M1 only] A1 cao |
| | 30 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 600 | 120 | 720 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 120 | 24 | 144 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 720 | 144 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 3 | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 1 | 2 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

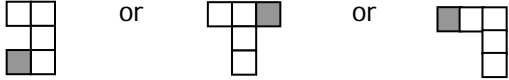

| 5384F/11F | | | | |
|-----------|----------------------------|--|------|---|
| Question | Working | Answer | Mark | Notes |
| 14 | | Correct tessellation | 2 | B2 for at least 6 correct shapes (including initial shape) correctly tessellating (B1 for at least 4 correct shapes (including initial shape) correctly tessellating) |
| 15 | $\frac{14}{20} \times 100$ | 70 | 2 | M1 for $\frac{14}{20} \times 100$ or $\frac{1400}{20}$ or 14×5 seen or $\frac{70}{100}$ or $\frac{7}{10}$ OR for a correct method to turn fraction into percentage OR for a correct decomposition, e.g. $10+2+2=50\%+10\%+10\%$ (condone one error) A1 cao |
| 16 | $360 - (120 + 140 + 58)$ | 42 | 2 | M1 $360 - (120 + 140 + 58)$ or equivalent) or for $(a + 58 + 120 + 140 = 360)$ oe seen A1 cao [Note: The subtraction MUST be from 360] |
| 17 | (a) | Vertices at $(2, -2), (7, -2), (7, -6),$ $(4, -6), (4, -4), (2, -4)$ | 2 | B2 for a fully correct rotation [B1 for correct shape with correct orientation OR a 90° anticlockwise rotation about O OR a 180° rotation about O OR for any 3 correct sides in the correct position] |
| | (b) | Translation by $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ | 2 | B1 for translation B1 (indep) for $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ or 3 right and 1 down |

| 5384F/11F | | | | |
|-----------|---------|------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 18 | | 300, 90, 45, 225 | 3 | <p>M2 for any one of $200 + 100$ or $60 + 30$ or $30 + 15$ or $150 + 75$ or 300 or 90 or 45 or 225 seen.</p> <p>A1 cao or</p> <p>M1 for $12 \div 8$ or $6 \div 4$ or $3 \div 2$ or sight of 1.5</p> <p>M1 for $200 \times "1.5"$ or $60 \times "1.5"$ or $30 \times "1.5"$ or $150 \times "1.5"$</p> <p>A1 cao or</p> <p>M1 $200 \div 8$ or 25</p> <p>M1 25×12 or 300</p> <p>A1 cao or</p> <p>M1 $200 \div 4$ or 50</p> <p>M1 50×6 or 300</p> <p>A1 cao or</p> <p>M1 $200 \div 2$ or 100</p> <p>M1 100×3 or 300</p> <p>A1 cao</p> <p>(In any of the above methods the M marks can be awarded for equivalent calculations with 60, 30 or 150)</p> |

| 5384F/11F | | | | |
|-----------|---------|---|------|--|
| Question | Working | Answer | Mark | Notes |
| 19 | (a) | | 2 | M1 rectangle with either correct width or height or any square A1 cao |
| | (b) | | 2 | B2 for a correct sketch (B1 any 3-D sketch of no more than 4 faces seen, with a trapezoidal face) |
| 20 | (a) | $2x - 3 + x + 6 + 3x + 1$ | 2 | M1 for $2x - 3 + x + 6 + 3x + 1$ or $6x + k$ seen A1 for $6x + 4$, condone $P = 6x + 4$ but not $x = 6x + 4$ or $0 = 6x + 4$ |
| | (b) | $6x + 4 = 37$ $6x = 33$ $x = 5.5$ | 2 | M1 for " $6x + 4$ " = 37, must be 3 term linear equation with coefficient of $x \neq 1$ A1 for 5.5, $\frac{11}{2}$, $5\frac{1}{2}$ oe or ft for their " $6x + 4$ " provided x is positive. OR M1 for a correct 2 stage numerical process to find x A1 for 5.5, $\frac{11}{2}$, $5\frac{1}{2}$ oe or ft for their " $6x + 4$ " provided x is positive. T&I Allow 2 marks for 5.5oe , otherwise 0 (SC B1 " $x + k = 37$ " or " $kx = 37$) NB Do not award marks in (a) for $6x + 4$ in (b) |

| 5384F/12F | | | | |
|-----------|------------------------------------|------------------|------|---|
| Question | Working | Answer | Mark | Notes |
| 1 (a) | | 0.9 | 1 | B1 for 0.9 |
| (b) | | 75 | 1 | B1 for 75 cao |
| (c) | | $\frac{23}{100}$ | 1 | B1 for $\frac{23}{100}$ o.e. |
| (d) | | 10 | 1 | B1 for 10 cao |
| 2 (a) | 5.85 + 4.90 | 10.75 | 1 | B1 for 10.75 |
| (b) | 60.55 ÷ 8.65 | 7 | 2 | M1 for 60.55 ÷ 8.65 or 8.65 × 7 = 60.55 or for at least 4 repeated additions or subtractions of 8.65 A1 for 7 cao |
| (c) | 8.65 + (4.90 + 4.90) 20 – 18.45 | 1.55 | 3 | M1 for 8.65 + (4.90 + 4.90) M1 (dep) for 20 – '18.45' A1 for 1.55 cao SC: Award B1 for sight of 18.45 or 6.45 or 10.20 Award B2 for 155 |
| 3 (i) | | Cone | 1 | B1 for cone or alternative spellings that sound like "cone". |
| (ii) | | Cylinder | 1 | B1 for cylinder or alternative spellings that sound like "cylinder". Accept circular based prism. |
| 4 (a) | | 6.4 | 1 | B1 for 6.2 – 6.6 inclusive; accept 62-66 with mm stated. |
| (b) | | Midpoint marked | 1 | B1 for midpoint marked at 3 – 3.4 inclusive |

| 5384F/12F | | | | |
|-----------|--------------------------------|-------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 5 (a) | | 60 | 1 | B1 for 60 cao |
| (b) | | reason | 1 | B1 for no 90° angle oe |
| 6 (a) | $6 \times 3 + 4$ | 22 | 2 | M1 for 6×3 or ' 6×3 ' + 4 or 18 seen A1 for 22, accept 22.00 or 22.0 |
| (b) | $52 - 4 = 48$ $48 \div 6 =$ | 8 | 3 | M1 for $52 - 4$ or 48 seen M1 (dep) for ' $52 - 4$ ' $\div 6$ or $48 \div 6$ A1 for 8 cao Alternative method: M2 for a systematic attempt using $6 \times d + 4$ at least twice with at least one d greater than 5 with correct answers A1 for 8 cao |
| 7 (i) | $\frac{10}{100} \times 7200$ | 720 | 2 | M1 for $\frac{10}{100} \times 7200$ oe A1 (accept 720.00 or 720.0) |
| (ii) | $7200 - 720$ | 6480 | 1 | B1 ft from (i) for $7200 - '720'$ |
| 8 | | correct net | 3 | B3 for correct net (B2 for 5 faces drawn, all correct or 6 faces drawn with 4 or 5 faces correct (B1 for a fully correct net with 6 faces for any cuboid) Note: Accept outline only drawn |
| 9 (a) | | A and C | 1 | B1 c for A and C or C and A |
| (b) | | Shape drawn | 1 | B1 for correct shape, any orientation or reflection, ± 2 mm |

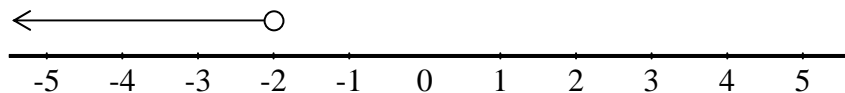
| 5384F/12F | | | | |
|-----------|--|---------|------|---|
| Question | Working | Answer | Mark | Notes |
| 10 (a) | | shading | 1 | B1 for one square shaded to get one of  |
| (b) | | shading | 1 | B1 for one square shaded to get  |
| 11 | $\frac{1}{6} \times 36 = 6$ $\frac{2}{9} \times 36 = 8$ $36 - (8 + 6)$ | 22 | 3 | M1 for $\frac{1}{6} \times 36$ or $36 \div 6$; $\frac{2}{9} \times 36$ or $36 \div 9 \times 2$ or 6 seen as long as not with incorrect working or 8 seen or 14 seen or $\frac{1}{6} + \frac{2}{9}$ or $\frac{7}{18}$ oe M1 (dep) for $36 - '(8 + 6)'$ or $36 - \left(\frac{2}{9} + \frac{1}{6}\right) \times 36$ or $\left(1 - \frac{1}{6} + \frac{2}{9}\right) \times 36$ A1 for 22 cao SC B2 for $\frac{22}{36}$ oe fraction |

| 5384F/12F | | | | |
|-----------|---|----------------------------|------|---|
| Question | Working | Answer | Mark | Notes |
| 12 (a) | $1.8 \times -8 + 32$ | 17.6 | 2 | M1 for 1.8×-8 or -14.4 or $\frac{-72}{5}$ seen or $32 - '1.8 \times 8'$ or $1.8 \times -8 + 32$ seen A1 for 17.6 or $\frac{88}{5}$ or 17.60 oe |
| (b) | $68 = 1.8C + 32$ $1.8C = 68 - 32$ $C = 36 \div 1.8$ | 20 | 2 | M1 for $68 - 32$ or 36 or $68 = 1.8C + 32$ seen; Condone replacement of C by another letter. A1 for 20 cao NB: Trial and improvement scores 0 or 2 |
| 13 (a) | 325×1.68 | 546 | 2 | M1 for 325×1.68 seen or digits 546 A1 for 546, accept 546.00, 546.0 |
| (b) | $117 \div 1.5$ | 78 | 2 | M1 for $117 \div 1.5$ seen or digits 78 A1 for 78, accept 78.00, 78.0 |
| 14 (a) | | Correct shape | 2 | B2 for correct shape; any orientation. (B1 for any two sides correct or all correct for scale factor other than 1 or 2), tolerance to within half square |
| (b) | | Reflection in line $x = 0$ | 2 | B1 for reflection, reflect, reflected. B1 for line $x = 0$ or y-axis NB: More than one transformation should be awarded 0 marks. |

| 5384F/12F | | | | |
|-----------|--|-----------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 15 (a) | $18 \div 6 : 12 \div 6$ | $3 : 2$ | 2 | M1 for $18 : 12$ or $12 : 18$ or $1.5 : 1$ oe or $1:0.67$ oe or correct ratio reversed eg $2 : 3$ A1 for $3 : 2$ or $1 : 0.666 \dots$ [recurring] |
| (b) | $5 + 1 = 6$ $54 \div 6 = 9$ 5×9 | 45 | 2 | M1 for $\frac{5}{5+1} \times 54$ or $\frac{1}{5+1} \times 54$ or $54 \div '5+1'$ or 54×5 or 270 or $9 : 45$ or 9 seen, as long as it is not associated with incorrect working A1 for 45 cao |
| 16 (a) | t^{6+2} | t^8 | 1 | B1 for t^8 or for t^{6+2} |
| (b) | m^{8-3} | m^5 | 1 | B1 for m^5 or for m^{8-3} |
| 17 | $(0.5 \times 3.14 \dots \times 8) + 8$ | $20.56 - 20.58$ | 3 | M2 for $(0.5 \times \pi \times 8)$ or $\pi \times 4$ or $(\pi \times 8 + 8)$ or $(0.5 \times \pi \times 8 + 8)$ oe (M1 for $\pi \times 8$ or $2\pi \times 4$ or for a value 25.1– 25.2 inclusive unless seen with incorrect working eg πr^2) A1 for 20.56 – 20.58 (SC: B2 if M0 scored for 12.56 – 12.58) |

| 5384F/12F | | | | |
|-----------|--|-------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 18 (a) | | See diagram below | 2 | B2 for correct directed line from -2 , ± 2 mm and an empty circle (B1 for only one of these correct) |
| (b) | $5y + 10 = 4 - 7y$ $12y + 10 = 4$ $12y = -6$ $y = -\frac{1}{2}$ | $-\frac{1}{2}$ | 3 | B1 for $5y + 10$ M1 for $5y + 7y = 4 - "10"$ oe A1 for $-\frac{1}{2}$ oe OR M1 for $y + 2 = \frac{4-7y}{5}$ oe M1 for $y + "\frac{7y}{5}" = "\frac{4}{5}" - 2$ oe A1 for $-\frac{1}{2}$ oe |



Question 18a



| 5384H/13H | | | | |
|-----------|---------|------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 1 | | 300, 90, 45, 225 | 3 | <p>M2 for any one of $200 + 100$ or $60 + 30$ or $30 + 15$ or $150 + 75$ or 300 or 90 or 45 or 225 seen.</p> <p>A1 cao or</p> <p>M1 for $12 \div 8$ or $6 \div 4$ or $3 \div 2$ or sight of 1.5</p> <p>M1 for $200 \times "1.5"$ or $60 \times "1.5"$ or $30 \times "1.5"$ or $150 \times "1.5"$</p> <p>A1 cao or</p> <p>M1 $200 \div 8$ or 25 M1 25×12 or 300 A1 cao or</p> <p>M1 $200 \div 4$ or 50 M1 50×6 or 300 A1 cao or</p> <p>M1 $200 \div 2$ or 100 M1 100×3 or 300 A1 cao</p> <p>(In any of the above methods the M marks can be awarded for equivalent calculations with 60, 30 or 150)</p> |
| 2 | | $\frac{3}{20}$ | 2 | <p>M1 for clear attempt to multiply numerators and multiply denominators e.g. $\frac{3 \times 1}{5 \times 4}$ or $\frac{12 \times 5}{20 \times 20}$</p> <p>A1 for $\frac{3}{20}$ oe</p> |

| 5384H/13H | | | | | |
|-----------|---------|--|----------|-------|--|
| Question | Working | Answer | Mark | Notes | |
| 3 | (a) | $2x - 3 + x + 6 + 3x + 1$ | $6x + 4$ | 2 | M1 for $2x - 3 + x + 6 + 3x + 1$ or $6x + k$ seen A1 for $6x + 4$, condone $P = 6x + 4$ but not $x = 6x + 4$ or $0 = 6x + 4$ |
| | (b) | $6x + 4 = 37$ $6x = 33$ $x = 5.5$ | 5.5 | 2 | M1 for " $6x + 4 = 37$ ", must be 3 term linear equation with coefficient of $x \neq 1$ A1 for 5.5, $\frac{11}{2}$, $5\frac{1}{2}$ oe or ft for their " $6x + 4$ " provided x is positive. Or M1 for a correct 2 stage numerical process to find x A1 for 5.5, $\frac{11}{2}$, $5\frac{1}{2}$ oe or ft for their " $6x + 4$ " provided x is positive. T&I Allow 2 marks for 5.5oe , otherwise 0 (SC B1 " $x + k = 37$ " or " $kx = 37$) NB Do not award marks in (a) for $6x + 4$ in (b) |
| 4 | | $20 \div 5 (=4)$ $20 - "4" (=16)$ " 16 " \times 1.50 (=24) | 9 | 4 | M1 for $20 \div 5$ M1 for $20 - "4"$ where $0 < "4" < 20$ M1 for " 16 " \times 1.50 where $0 < "16" < 20$ A1 cao |

| 5384H/13H | | | | |
|-----------|---------|--------------------|------|---|
| Question | Working | Answer | Mark | Notes |
| 5 | (a) | | 2 | B2 for a fully correct rotation [B1 for correct shape with correct orientation OR a 90° anticlockwise rotation about O OR a 180° rotation about O OR for any 3 correct sides in the correct position] |
| | (b) | | 2 | B1 for translation B1 (indep) for $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ or 3 right and 1 down N.B. If more than 1 transformation is given then award no marks' |
| 6 | (a) | | 2 | M1 for $2y - 6 = 8$ or $y - 3 = \frac{8}{2}$ A1 cao |
| | (b) | $4x - 2x = 12 - 1$ | 2 | M1 $4x - 2x = 12 - 1$ oe A1 5.5 oe |
| 7 | | $x^2 = 72 \div 2$ | 2 | M1 for $72 \div 2$ or 36 seen A1 6 or -6 or ± 6 |
| 8 | (a) | | 2 | B2 for all 3 values correct (B1 for 1 or 2 values correct) |
| | (b) | | 2 | B1 ft for all 7 of their points correctly plotted B1 ft (dep on at least B1 in (a)) for smooth curve through all 7 of their points |

| 5384H/13H | | | | | |
|-----------|-----|---------|--|------|--|
| Question | | Working | Answer | Mark | Notes |
| 9 | (a) | |  | 2 | M1 rectangle with either correct width or height or any square A1 cao |
| | (b) | |  | 2 | B2 for a correct sketch (B1 any 3-D sketch of no more than 4 faces seen, with a trapezoidal face) |
| 10 | | | Diagram | 4 | M1 arc radius 4 cm centre B within the guidelines M1 angle bisector from A to BC within the guidelines A1 for clear indication that inside of arc is being identified as correct region for the first condition, or that side of straight line nearer to C is identified as correct region for the second condition. (Note that only 1 of the Ms need be awarded for this A mark to be awarded) A1 fully correct region Ignore any drawing outside the given triangle |

| 5384H/13H | | | | | |
|-----------|--|---|-------------|--|--|
| Question | Working | Answer | Mark | Notes | |
| 11 | $3x + 4y = 7$ $10x - 4y = 32$ $13x = 39$ $x = 3$ $3 \times 3 + 4y = 7$ $4y = -2$ $x = \frac{7-4y}{3}$ $10\left(\frac{7-4y}{3}\right) - 4y = 32$ | $x = 3, y = -\frac{1}{2}$ | 3 | M1 for coefficients of x or y the same followed by correct operation, condone one arithmetical error M1 (dep) for substituting found value in one equation A1 cao SC: B1 for one correct answer only if Ms not awarded Alternative method M1 for rearranging one equation and substituting in other to eliminate one variable(condone one arithmetical error) M1 (dep) for substituting found value in one equation A1 cao | |
| 12 | (a) | $3t + 1 < t + 12$ $3t - t < 12 - 1$ $2t < 11$ | $t < 5.5$ | 2 | M1 $3t - t < 12 - 1$ A1 $t < 5.5$ oe (B1 for $t = 5.5$ or $t > 5.5$ or 5.5 or $t \leq 5.5$ or $t \geq 5.5$ on the answer line) |
| | (b) | | 5 | 1 | B1 for 5 or ft (a) |
| 13 | (i) | | 170° | 1 | B1 cao |
| | (ii) | | Reason | 1 | B1 for Angle at centre is twice angle at circumference (accept edge, middle, O origin)oe |

| 5384H/13H | | | | |
|-----------|------------------|---------------|------|---|
| Question | Working | Answer | Mark | Notes |
| 14 | $(x + 5)(x - 9)$ | 9, -5 | 3 | <p>M2 for $(x - 9)(x + 5)$ (M1 for $(x \pm 9)(x \pm 5)$ A1 cao 9 and -5</p> <p>OR</p> <p>M1 for substitution into formula (condone incorrect signs) M1 for $\frac{4 \pm \sqrt{196}}{2}$ A1 cao</p> <p>OR</p> <p>M1 for $(x - 2)^2 - 2^2 - 45 (= 0)$ M1 for $x = 2 \pm \sqrt{4 + 45}$ A1 cao</p> <p>OR T&I B3 Both solutions correct (B1 One solution correct)</p> |
| 15 | (a) | 6 | 1 | B1 for 6 or ± 6 |
| | (b) | $\frac{1}{4}$ | 2 | <p>M1 for $8^{\frac{1}{3}} = 2$ or $\frac{1}{\frac{1}{2}}$ or 4^{-1} or $64^{\frac{1}{3}}$ or 2^2 or 4 or $\frac{1}{2^2}$ or 2^{-2}</p> <p>A1 for $\frac{1}{4}$ or 0.25 or any equivalent vulgar fraction or decimal</p> |

| 5384H/13H | | | | |
|-----------|---|--------|------|---|
| Question | Working | Answer | Mark | Notes |
| 16 | $AB = AC$ (equilateral triangle) AD is common $ADC = ADB$ ($= 90^\circ$ given) $\triangle ADC \equiv \triangle ADB$ (RHS) OR $DAC = DAB$ (since $ACD = ABD$ and $ADC = ADB$) $AB = AC$ (equilateral triangle) AD is common $\triangle ADC \equiv \triangle ADB$ (SAS) OR $DAC = DAB$ (since $ACD = ABD$ and $ADC = ADB$) AD is common $ACD = ABD$ (equilateral triangle) $\triangle ADC \equiv \triangle ADB$ (AAS) | Proof | 3 | M1 for any three correct statements (which do not have to be justified) that together lead to a congruence proof (ignore irrelevant statements) A1 for a full justification of these statements A1 for RHS, SAS, AAS, ASA or SSS as appropriate NB The two A marks are independent |

| 5384H/13H | | | | |
|-----------|--|----------------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 17 | $\frac{1}{u} = \frac{1}{f} - \frac{1}{v}$ $\frac{1}{u} = \frac{v-f}{fv}$ | $u = \frac{fv}{v-f}$ | 2 | M1 $\frac{1}{u} = \frac{v-f}{fv}$ oe or $vf + uf = uv$ oe or $\frac{1}{u} = \frac{f-v}{fv}$ or $u = \frac{1}{\frac{v-f}{fv}}$ or $u = \frac{1}{\frac{1}{f} - \frac{1}{v}}$ A1 $u = \frac{fv}{v-f}$ or $u = \frac{-fv}{f-v}$ |
| 18 | $2 \times 7 - 2 \times \sqrt{3} + 7 \times \sqrt{3} - \sqrt{3} \times \sqrt{3} =$ $14 + 5\sqrt{3} - 3$ | $11 + 5\sqrt{3}$ | 3 | M1 for exactly 3 or exactly 4 terms correct including correct signs or all 4 terms correct with wrong signs. M1(dep) for either collecting their two or three terms in $\sqrt{3}$ or for $\sqrt{3} \times \sqrt{3} = 3$ A1 cao |
| 19 | $\frac{120}{360} \times \pi \times 2 \times 6$ | $4\pi + 12$ | 3 | M1 for $\frac{120}{360} \times \pi \times 2 \times 6$ oe allow 3.14, 3.142, $\frac{22}{7}$ for π A1 for 4π or anything in the closed interval [12.56, 12.57], or $12\frac{4}{7}$ oe or $\frac{a\pi}{b}$ where a and b are integers with $a = 4b$ A1 $4\pi + 12$ or $\pi 4 + 12$ oe SC(B2 for a fully correct, but unsimplified expression for the perimeter, including $\left(\frac{2\pi r}{3}\right) + 12$ or $\left(\frac{2\pi r}{3}\right) + 2r$ Or for any value in the closed interval [24.56, 24.57]) |

| 5384H/14H | | | | | |
|-----------|---------|---|----------------------------|-------|--|
| Question | Working | Answer | Mark | Notes | |
| 1 | (a) | 325×1.68 | 546 | 2 | M1 for 325×1.68 seen or digits 546 A1 for 546, accept 546.00, 546.0 |
| | (b) | $117 \div 1.5$ | 78 | 2 | M1 for $117 \div 1.5$ seen or digits 78 A1 for 78, accept 78.00, 78.0 |
| 2 | (a) | | Correct shape | 2 | B2 for correct shape; any orientation. (B1 for any two sides correct or all correct for scale factor other than 1 or 2), tolerance to within half square |
| | (b) | | Reflection in line $x = 0$ | 2 | B1 for reflection, reflect, reflected. B1 for line $x = 0$ or y -axis NB: more than one transformation should be awarded 0 marks. |
| 3 | | $143.64 \div 19 = 7.56$ $7.56 \times 31 =$ | 234.36 | 3 | M1 for $143.64 \div 19$ (or 7.56 seen) or 143.64×31 (or 4452.84 seen) M1(dep) for ' 7.56 ' $\times 31$ or ' 4452.84 ' $\div 19$ or $143.64 + 12 \times '7.56'$ A1 for 234.36 cao accept 234.36p Alternative method: M1 for $\frac{31}{19}$ (or 1.63(1...)) seen M1 (dep) ' $1.63\dots$ ' $\times 143.64$ A1 for 234.36 cao accept 234.36p |

| 5384H/14H | | | | | |
|-----------|---------|---|-------|-------|--|
| Question | Working | Answer | Mark | Notes | |
| 4 | (a) | $1.8 \times -8 + 32$ | 17.6 | 2 | M1 for 1.8×-8 or -14.4 or $\frac{-72}{5}$ seen or $32 - '1.8 \times 8'$ or $1.8 \times -8 + 32$ seen A1 for 17.6 or $\frac{88}{5}$ or 17.60 oe |
| | (b) | $68 = 1.8C + 32$ $1.8C = 68 - 32$ $C = 36 \div 1.8$ | 20 | 2 | M1 for $68 - 32$ or 36 or $68 = 1.8C + 32$ seen; condone replacement of C by another letter. A1 for 20 cao NB Trial and improvement score 0 or 2 |
| 5 | (a) | $18 \div 6 : 12 \div 6$ | 3 : 2 | 2 | M1 for $18 : 12$ or $12 : 18$ or $1.5:1$ or $1:0.67$ oe or correct ratio reversed eg 2:3 A1 for 3 : 2 or 1 : 0.6 ... [recurring] |
| | (b) | $5 + 1 = 6$ $54 \div 6 = 9$ 5×9 | 45 | 2 | M1 for $\frac{5}{5+1} \times 54$ or $\frac{1}{5+1} \times 54$ or $54 \div '5+1'$ or 54×5 or 270 or 9 : 45 or 9 seen, as long as it is not associated with incorrect working. A1 for 45 cao |

| 5384H/14H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----------|--|---------------|------|--|----|-----|----------|-----|----------|-----|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|------|----------|-----|---|---|
| Question | Working | | Answer | Mark | Notes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | <table border="1"> <tr><td>2</td><td>48</td></tr> <tr><td>3</td><td>87</td></tr> <tr><td>2.5</td><td>65.(625)</td></tr> <tr><td>2.6</td><td>69.(576)</td></tr> <tr><td>2.7</td><td>73.(683)</td></tr> <tr><td>2.65</td><td>71.6(09)</td></tr> <tr><td>2.61</td><td>69.9(79)</td></tr> <tr><td>2.62</td><td>70.3(84)</td></tr> <tr><td>2.63</td><td>70.7(91)</td></tr> <tr><td>2.64</td><td>71.1(99)</td></tr> <tr><td>2.66</td><td>72.(021)</td></tr> <tr><td>2.67</td><td>72.4(34)</td></tr> <tr><td>2.68</td><td>72.8(48)</td></tr> <tr><td>2.69</td><td>73.2(65)</td></tr> </table> | 2 | 48 | 3 | 87 | 2.5 | 65.(625) | 2.6 | 69.(576) | 2.7 | 73.(683) | 2.65 | 71.6(09) | 2.61 | 69.9(79) | 2.62 | 70.3(84) | 2.63 | 70.7(91) | 2.64 | 71.1(99) | 2.66 | 72.(021) | 2.67 | 72.4(34) | 2.68 | 72.8(48) | 2.69 | 73.2(65) | 2.6 | 4 | <p>B2 for trial $2.6 \leq x \leq 2.7$ evaluated (B1 for trial $2 \leq x \leq 3$ evaluated)</p> <p>B1 for different trial $2.6 < x \leq 2.65$</p> <p>B1(dep on at least one previous B1) for 2.6</p> <p>Values evaluated can be rounded or truncated, but to at least 2sf when x has 1dp and 3sf when x has 2dp</p> <p>NB Allow 72 for evaluation using $x = 2.66$</p> <p>NB No working scores no marks even if answer is correct</p> |
| 2 | 48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 87 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.5 | 65.(625) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.6 | 69.(576) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.7 | 73.(683) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.65 | 71.6(09) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.61 | 69.9(79) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.62 | 70.3(84) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.63 | 70.7(91) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.64 | 71.1(99) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.66 | 72.(021) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.67 | 72.4(34) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.68 | 72.8(48) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.69 | 73.2(65) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | construction | 2 | <p>M1 for a pair of arcs drawn from the same centre on 2 lines at same distance from meeting point; or a single arc crossing both lines; using an arc with a radius which is the length of the shorter line will imply an intersection with the end of that line. ($\pm 2\text{mm}$)</p> <p>A1 for bisector ($\pm 2^\circ$) and correct arcs</p> <p>SC: B1 for bisector ($\pm 2^\circ$) with no arcs, or incorrect arcs if M0 awarded.</p> <p>Accept bisectors that are dashed or dotted.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | $(0.5 \times 3.14... \times 8) + 8$ | 20.56 - 20.58 | 3 | <p>M2 for $(0.5 \times \pi \times 8)$ or $\pi \times 4$ or $(\pi \times 8 + 8)$ or $(0.5 \times \pi \times 8 + 8)$ oe</p> <p>(M1 for $\pi \times 8$ or $2\pi \times 4$; for a value 25.1-25.2 inclusive unless seen with incorrect working eg πr^2)</p> <p>A1 for 20.56 – 20.58</p> <p>(SC: B2 if M0 scored for 12.56 - 12.58)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 5384H/14H | | | | |
|-----------|--|--|------------------|---|
| Question | Working | Answer | Mark | Notes |
| 9 | $4.6 + 3.85 = 8.45$ $3.2^2 - 6.51 = 3.73$ $8.45 \div 3.73 =$ | 2.26541555 | 2 | M1 for $\frac{169}{20}$ or $\frac{256}{25}$ or $\frac{373}{100}$ or 3.73 or 10.24 or 8.45 seen A1 for 2.265(41555); accept $\frac{845}{373}$ |
| 10 | (a) t^{6+2} (b) m^{8-3} (c) $2^3 \times x^3$ (d) $3 \times 4 \times a^{2+5} \times h^{1+4}$ | t^8 m^5 $8x^3$ $12a^7h^5$ | 1 1 2 2 | B1 for t^8 or for t^{6+2} B1 for m^5 or for m^{8-3} B2 for $8x^3$ cao (B1 for ax^3 , $a \neq 8$ or $2x \times 2x \times 2x$ or $8x^n$, $n \neq 0,3$) B2 for $12a^7h^5$ (B1 for $12a^7h^n$, $n \neq 0,5$ or $12a^mh^5$, $m \neq 0,7$ or ka^7h^5 , $k \neq 12$ or $3 \times 4 \times a^{2+5} \times h^{1+4}$) |

| 5384H/14H | | | | |
|-----------|--|--------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 11 | $9^2 - 6^2$ $81 - 36 = 45$ $\sqrt{45}$ | 6.705 - 6.71 | 3 | M1 for $9^2 - 6^2$ or $81 - 36$ or 45 or $9^2 = AB^2 + 6^2$ oe M1 for $\sqrt{81 - 36}$ or $\sqrt{45}$ A1 for 6.705 - 6.71 [SC: M1 for $\sqrt{81 + 36}$ or $\sqrt{117}$] |
| 12 | 4500×1.04^2 | 4867.20 | 3 | M1 for 4500×1.04 or for $4500 + 0.04 \times 4500$ or for 4680 or 180 or 360 or 4860 M1 (dep) '4680' $\times 1.04$ or for '4680' $+ 0.04 \times$ '4680' A1 for 4867.2(0) cao (If correct answer seen then ignore any extra years) Alternative method M2 for 4500×1.04^2 or 4500×1.04^3 A1 for 4867.2(0) cao [SC: 367.2(0) seen B2] |

| 5384H/14H | | | | |
|-----------|------------------------|--------------|------|--|
| Question | Working | Answer | Mark | Notes |
| 13 | $\cos x = \frac{5}{8}$ | 51.3 - 51.35 | 3 | <p>M1 for $\cos(x) = \frac{5}{8}$</p> <p>M1 for $\cos^{-1} \frac{5}{8}$ or $\cos^{-1} 0.625$, or $\cos^{-1}(5 \div 8)$</p> <p>A1 for 51.3 - 51.35 (SC B2 for 0.89 - 0.9 or 57 - 57.1 seen)</p> <p>Alternative Scheme $h^2 = 8^2 - 5^2 (=39)$</p> <p>M1 for $\sin(x) = \frac{\sqrt{39}}{8}$ or $\tan(x) = \frac{\sqrt{39}}{5}$ or</p> <p>$\frac{\sin x}{\sqrt{39}} = \frac{\sin 90}{8}$ oe or</p> <p>$(\sqrt{39})^2 = 8^2 + 5^2 - 2 \times 8 \times 5 \times \cos x$</p> <p>M1 for $\sin^{-1}(\frac{\sqrt{39}}{8})$ or $\sin^{-1}(\frac{\sqrt{39} \times \sin 90}{8})$ or</p> <p>$\tan^{-1}(\frac{\sqrt{39}}{5})$ or $\cos^{-1}(\frac{8^2 + 5^2 - (\sqrt{39})^2}{2 \times 8 \times 5})$</p> <p>A1 for 51.3 - 51.35</p> |

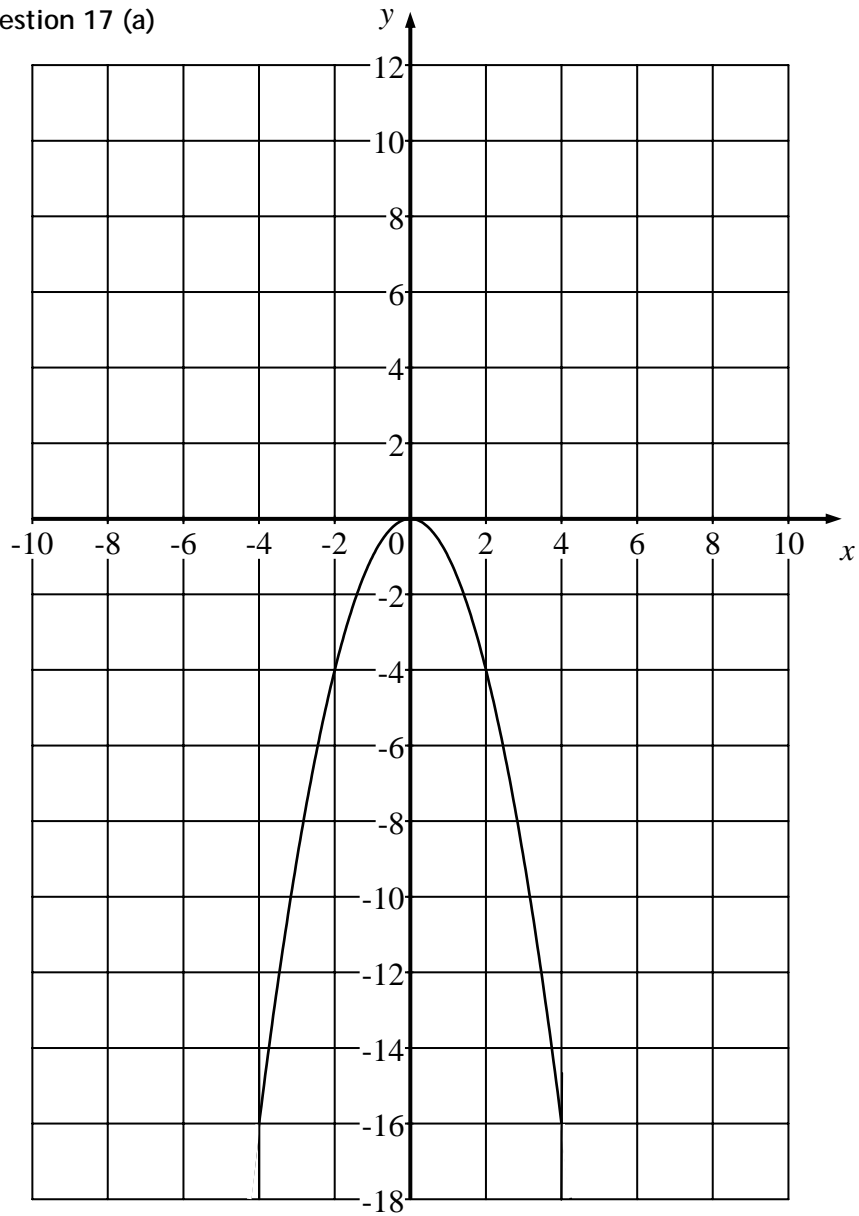
| 5384H/14H | | | | |
|-----------|---|--------|------|---|
| Question | Working | Answer | Mark | Notes |
| 14 | $P = \frac{k}{d^2}$ $k = Pd^2 = 10000 \times 0.4^2$ $= 1600$ when $d = 0.8$, $P = \frac{1600}{0.8^2}$ | 2500 | 3 | M1 $P = \frac{k}{d^2}$ or $P \propto \frac{1}{d^2}$ M1 $k = 10000 \times 0.4^2$ A1 2500 cao OR M1 $\frac{x}{10000} = \frac{0.4^2}{0.8^2}$ M1 $\frac{0.4^2}{0.8^2} \times 10000$ A1 2500 cao |

| 5384H/14H | | | | |
|-----------|---|---------------------------|------------|---|
| Question | Working | Answer | Mark | Notes |
| 15 | (a) | | | |
| | $x = \frac{- -2 \pm \sqrt{(-2)^2 - 4 \times 1 \times (-1)}}{2}$ $= \frac{2 \pm \sqrt{8}}{2}$ $= \frac{2 \pm 2.82843}{2}$ $x = -0.4142 \text{ or } x = 2.4142$ | -0.41, 2.41 | 3 | M1 for substitution into formula (condone incorrect signs) $\frac{2 \pm \sqrt{8}}{2}$ M1 for $\frac{2 \pm \sqrt{8}}{2}$ A1 for -0.41 to -0.415 and 2.41 to 2.415 OR M1 for $(x-1)^2 - 1^2 - 1$ seen M1 for $(x-1) = \pm\sqrt{2}$ A1 for -0.41 to -0.415 and 2.41 to 2.415 T&I B3 both solutions, B1 1 solution |
| | (b) | | | |
| | | -0.41, 2.41 | 1 | B1 ft from (a) |
| 16 | (a) | | | |
| | (b) | | | |
| | $\vec{OP} = \vec{OA} + \vec{AP}$ $\vec{OP} = a + \frac{3}{5}(b - a)$ $\vec{OP} = \frac{1}{5}(2a + 3b)$ | b - a proof | 1 3 | B1 for b - a or - a + b oe M1 for $\vec{OP} = \vec{OA} + \vec{AP}$ oe or $\vec{OP} = \vec{OB} + \vec{BP}$ oe M1 for $\vec{AP} = \frac{3}{5}x$ "(b - a)" oe or $\vec{BP} = \frac{2}{5}x$ "(a - b)" oe A1 for $a + \frac{3}{5}x$ (b - a) oe or $b + \frac{2}{5}x$ (a - b) oe leading to given answer with correct expansion of brackets seen |

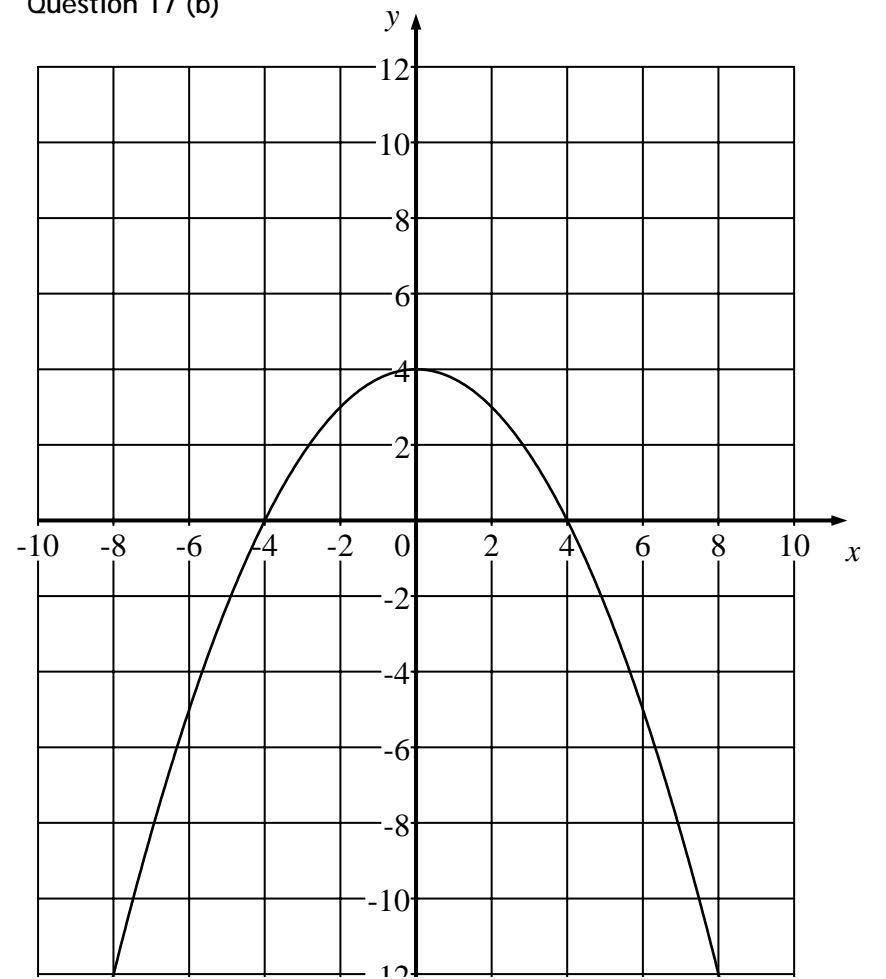
| 5384H/14H | | | | | |
|-----------|-----|---------|--------|------|--|
| Question | | Working | Answer | Mark | Notes |
| 17 | (a) | | Curve | 2 | B2 parabola max (0,0), through (-2, -4) and (2, -4) Tol ½sq (B1 parabola with single maximum point (0,0) or through (-2, -4) and (2, -4), but not both or the given parabola translated along the y-axis by any other value than -4 - the translation must be such that the points (0,4), (-2,0), (2,0) are translated by the same amount. Tol ½sq) |
| | (b) | | Curve | 2 | B2 parabola max (0,4), through (-4, 0) and (4,0) Tol ½sq (B1 parabola with single maximum point (0,4)) Tol ½sq |

PTO for graphs for Q17

Question 17 (a)



Question 17 (b)



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