

# REVISE

.wales

## **F3.06 – Similar shapes & congruence – basic**

*Mark schemes for the F3.06 question pack*

*Spec 3.9.1, 3.9.2 – Unit 3*

SOLUTIONS · 2025 SPECIFICATION

*Mark schemes for the 11 questions in the corresponding revise.wales question pack (26 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.*

2.

Circles	TRUE	
Squares	TRUE	
Triangles		FALSE
Rectangles		FALSE
Reg. Hexagons	TRUE	

B3

For all 5 correct  
B2 for 4 correct.  
B1 for 3 correct

<p>5. (18% of £256 =) <math>0.18 \times 256</math>  <math>= (£)46.08</math></p> <p>(Larger share =) <math>\frac{2 \times 46.08}{3}</math>  <math>= (£)30.72</math></p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1 A1</p> <p>M1 A1</p> <p>B1</p>	<p>Allow (£)46.10</p> <p>FT 'their stated 18%'.</p> <p>If M0 allow SC1 for sight of (£)15.36</p> <p>FT 'their larger share' (not 'their 18%') and only if rounding required.</p>
<p>5. <u>Alternative method 1</u>  (Larger share of £256 =) <math>\frac{2 \times 256}{3}</math>  <math>= (£)170.66(\dots)</math></p> <p>(18% of £170.66 =) <math>0.18 \times 170.66</math>  <math>= (£)30.72</math></p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1 A1</p> <p>M1 A1</p> <p>B1</p>	<p>Allow (£)170.70  If M0 allow SC1 for sight of (£)85.33.</p> <p>FT 'their stated larger share'.</p> <p>FT 'their 18%' (not 'their larger share') and only if rounding required.</p>
<p>5. <u>Alternative method 2</u>  (Larger share of 18% =) <math>\frac{2 \times 18}{3}</math>  <math>= 12(\%)</math></p> <p>(12% of £256 =) <math>0.12 \times 256</math>  <math>= (£)30.72</math></p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1 A1</p> <p>M1 A1</p> <p>B1</p>	<p>If M0 allow SC1 for sight of 6(%)</p> <p>FT 'their derived larger %'.</p> <p>FT 'their amount' only if rounding required.</p>
<p>5.OCW      Organisation and Communication.</p> <p>Accuracy of writing.</p>	<p>OC1</p> <p>W1</p>	<p>For OC1, candidates will be expected to:</p> <ul style="list-style-type: none"> <li>• present their response in a structured way</li> <li>• explain to the reader what they are doing at each step of their response</li> <li>• lay out their explanation and working in a way that is clear and logical</li> <li>• write a conclusion that draws together their results and explains what their answer means</li> </ul> <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> <li>• show all their working</li> <li>• make few, if any, errors in spelling, punctuation and grammar</li> <li>• use correct mathematical form in their working</li> <li>• use appropriate terminology, units, etc.</li> </ul>

<p>14. Two relevant (sides of one double the other) rectangles or squares considered.</p> <p>Perimeter AND area of 1<sup>st</sup> rectangle correctly calculated. Perimeter AND area of 2<sup>nd</sup> rectangle correctly calculated.</p> <p>Clear statement that the perimeter has been doubled but the area has not been doubled (and that Catrin is incorrect.)</p>	<p>M1</p> <p>B1</p> <p>B1</p> <p>A2</p>	<p>Sketch shown or lengths stated. If M0, only the B marks are available.</p> <p>Ignore missing units BUT penalise -1, once only, for incorrect units. (Applies to these B1 marks.)</p> <p>FT 'their <u>stated</u> values' for both perimeter and area.</p> <p>If not A2, then A1 for correct perimeter statement for 'their values'. OR A1 for correct area statement for 'their values'. Accept statement that area is 4 times as big.</p> <p>Allow for A2 'only the perimeter has been doubled'. (implies that the area has not been doubled.)</p> <p><u>Also for A2.</u> 'The area is not doubled so Catrin is incorrect' answers the question. In this case Award SC1 and SC1 (instead of B1 and B1) if areas correctly calculated.</p> <p>Correct statements, for BOTH perimeter and area, with <b>no</b> supporting work gains SC1.</p>
<p>15. (18% of £256 =) <math>0.18 \times 256</math> = (£)46.08</p> <p>(Larger share =) <math>\frac{2 \times 46.08}{3}</math> = (£)30.72</p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>B1</p>	<p>Allow (£)46.10</p> <p>FT 'their stated 18%'.</p> <p>If M0 allow SC1 for sight of (£)15.36</p> <p>FT 'their larger share' (not 'their 18%') and only if rounding required.</p>
<p>15. <u>Alternative method 1</u> (Larger share of £256 =) <math>\frac{2 \times 256}{3}</math> = (£)170.66(..)</p> <p>(18% of £170.66 =) <math>0.18 \times 170.66</math> = (£)30.72</p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>B1</p>	<p>Allow (£)170.70 If M0 allow SC1 for sight of (£)85.33.</p> <p>FT 'their stated larger share'.</p> <p>FT 'their 18%' (not 'their larger share') and only if rounding required.</p>
<p>15. <u>Alternative method 2</u> (Larger share of 18% =) <math>\frac{2 \times 18}{3}</math> = 12(%)</p> <p>(12% of £256 =) <math>0.12 \times 256</math> = (£)30.72</p> <p>(To the nearest 10p =) (£)30.7(0)</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>B1</p>	<p>If M0 allow SC1 for sight of 6(%)</p> <p>FT 'their derived larger %'.</p> <p>FT 'their amount' only if rounding required.</p>

## WJEC GCSE MATHEMATICS

## AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1 Intermediate Tier	Mark	Comments							
1.(a) 20(:)18 OR 8(:)18 p.m.	B1	B0 for (0)8:18 or 8:18 a.m or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.							
1.(b) 6 (hours) 40 (minutes)	B1								
1.(c) 265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.							
2.(a) Line $x = -4$ drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.							
2.(b)(i) Point C shown at $(-2, -4)$	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line')  Otherwise, B1 if Point C at $(-2, y)$ $y \neq 3$ . ( $\widehat{BAC} = 90^\circ$ ) SC1 for point C at $(5, -4)$ .							
2.(b)(ii) $(-2, -4)$	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.							
3.(a)(i) 2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.							
3.(a)(ii) 0.08	B1	Mark final answer							
3.(a)(iii) <u>Correctly</u> using a common denominator. $\frac{13}{18}$ or equivalent.	M1 A1	Mark final answer.							
3.(b) 0.05	B1								
4. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Answer</th> <th>Yes</th> <th>No</th> <th>Not sure</th> </tr> </thead> <tbody> <tr> <td>Number of students</td> <td>150</td> <td>50</td> <td>100</td> </tr> </tbody> </table>	Answer	Yes	No	Not sure	Number of students	150	50	100	B1 for (Yes =) 150 C.A.O.  B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{'Yes'})$ AND (Not sure =) $\frac{2}{3}(300 - \text{'Yes'})$ B3 If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{'Yes'})$ OR (Not sure =) $\frac{2}{3}(300 - \text{'Yes'})$ or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = $2 \times \text{'No'}$ . or B1 for 'Yes' + 'No' + 'Not sure' = 300.
Answer	Yes	No	Not sure						
Number of students	150	50	100						
5.(a) $4x = 10 - 7 (=3)$ $x = \frac{3}{4}$ or equivalent.	B1 B1	FT from $4x = b$ . Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg $4 \times 0.75 + 7 = 10$ for B2, but penalise -1 if contradicted by $x \neq 0.75$							
5.(b) $5d - 2e$	B2	Must be an expression for B2. B1 for sight of (+)5d OR sight of $-2e$ . B1 for $5d + -2e$ . Mark final answer.							
6. $a = 113$ $b = 67$ $c = 113$	B1 B1 B1	C.A.O. OR FT 180 - 'their a'. OR FT = 'their a' OR FT 180 - 'their b'.							
7. $AB = 13$ (cm)  (Area =) $13 \times 13$ $= 169$ (cm <sup>2</sup> )	B1  M1 A1	For any indication that side of square = 13 (cm). May be seen on the diagram. No FT (but note SC1). C.A.O. Unsupported 169 (cm <sup>2</sup> ) gains all 3 marks. If no marks gained award SC1 for a final answer of 144 (cm <sup>2</sup> )							

9(a)(i) Entries 146 and 160 in the table and the cumulative frequency diagram completed correctly (correct plots (11, 146) and (13, 160) and all plots joined)	B2	B1 for any one of the following: <ul style="list-style-type: none"> <li>• 146 and 160 in the table, correct plots but <b>not</b> joined</li> <li>• 146 and 160 in the table, with one correct plot and one incorrect plot in completing the <b>cumulative</b> frequency diagram with plots joined</li> <li>• one error in the table, including FT 'their 146' + 14 and these <b>cumulative</b> entries used correctly to complete the <b>cumulative</b> frequency diagram with plots joined</li> <li>• correct cumulative frequency diagram with plots joined, with incorrect, incomplete or not attempted entries in the table</li> </ul>
9(a)(ii) 8.2 to 8.4 (minutes)	B1	Answer space takes precedence Allow 8 minutes 12 seconds to 8 minutes 24 seconds  FT reading from the graph for 'their median', from $\frac{1}{2} \times$ 'their 160', provided 'their 160' $\geq 110$ , with a tolerance of $\frac{1}{2}$ small square from 'their <b>cumulative</b> frequency graph', provided it is possible to read 'their median' from the vertical axis on the graph paper provided
9(a)(iii) 7.2 minutes	B1	Answer space in the statement takes precedence, if blank award for indication of '7.2' (circled) in the list  Allow '7' in the answer space provided 7.2 indicated in the list Do not accept '8' in the answer space if 7.2 indicated in the list
9(a)(iv) $\frac{20}{160} (\times 100)$ or $\frac{1}{2} \times 25$ (%) or equivalent  12.5 (%) or 12½ (%)	M1  A1	FT for $(100 \times) 20$ /'their 160', provided 'their 160' $> 106$  On FT allow rounding or truncation to 1 decimal place
9(b) (Costs are 180 + 220) (£) 400 <b>AND</b> (Profit is 700 – 180 – 220) (£) 300  <b>OR</b> (Receipts / Costs =) $\frac{700}{400} (\times 100)$  (Percentage profit is) $\frac{300}{400} (\times 100)$ or $\frac{700}{400} (\times 100) - 1 (\times 100)$  75 (%)	B1  M1  A1	May be embedded, e.g. 700 – 400 = 300 (= 1.75 or 175%)  FT 'their 400' and 700 – 'their 400' provided their costs or profit are $\neq 180$ , $\neq 220$ and $\neq 700$  CAO  Allow if all costs and the total are consistently multiplied by 3.
9(c) $8(. )40 \div 1(. )20$ or $8(. )40 - 8(. )40 \div 6$ or equivalent  (£) 7 or 700 (p)	M1  A1	Accept a <b>complete</b> and <b>convincing</b> method of trial and improvement  If units are given they must be correct  Sight of $7 + 1.40 = 8.40$ is awarded M1 A0 unless (£)7 is selected

<p>15. (a) Any full valid explanation with reference to one or both correct scale factors (if fractions used, must be with a common denominator or in their simplest form)</p> <p>e.g. "the scale factor for one (corresponding) pair of sides is 1.5, the other is 1.25"</p> <p>"<math>9/6 = 1.5</math> <math>1.5 \times 8 = 12</math> <math>1.5 \times 8 \neq 10</math>"</p> <p>"<math>8/6 = 4/3</math> which is not the same as <math>10/9</math>"</p> <p>"<math>3/2</math> and <math>5/4</math> are not the same"</p> <p>"in A, the width is <math>3/4</math> of the length, but in B it is not"</p>	E2	<p>Award E1 for partial explanation</p> <p>e.g.</p> <ul style="list-style-type: none"> <li>• "the scale factor is not the same for each pair of sides"</li> <li>• "<math>10/8</math> is not the same as <math>9/6</math>"</li> <li>• "<math>10/9 \neq 8/6</math>"</li> <li>• "<math>9 : 10 \neq 6 : 8</math>"</li> <li>• "<math>8/10</math> is not the same as <math>6/9</math>"</li> <li>• "the sides should be 12 (cm) and 9 (cm)"</li> <li>• "the sides should be 10 (cm) and 7.5 (cm)"</li> </ul> <p><b>OR</b></p> <p>Award E1 for</p> <ul style="list-style-type: none"> <li>• two scale factors which can be compared (one must be correct) e.g. 1.5 and 1.3 or two fractions with a common denominator (<math>4/2</math> and <math>3/2</math>).</li> </ul>
<p>15.(b) <u>Method 1</u></p> <p><math>8 \times \frac{9}{6}</math> or <math>8 \times 1.5</math> or equivalent</p> <p style="text-align: center;">Length = 12 (cm) and Width = 9 (cm)</p>	M1 A1	<p>Answer space takes precedence.</p> <p>M1 for correct <u>use</u> of linear ratio.</p> <p>A1 Allow Length = 9 (cm) and Width = 12 (cm)</p>
<p>15.(b) <u>Method 2</u></p> <p><math>6 \times \frac{10}{8}</math> or <math>6 \times 1.25</math> or equivalent</p> <p style="text-align: center;">Length = 10 (cm) and Width = 7.5 (cm)</p>	M1 A1	<p>Answer space takes precedence.</p> <p>M1 for correct <u>use</u> of linear ratio.</p> <p>A1 Allow Length = 7.5 (cm) and Width = 10 (cm)</p>

<p>18. Sight of <math>(5x + 3)(2x - 1)</math> or <math>2(5x + 3)(2x - 1)</math> or equivalent</p> <p>(total area of both rectangles = <math>20x^2 + 2x - 6</math> (cm<sup>2</sup>))</p>	<p>S1</p> <p>B2</p>	<p>Intention to <math>(2 \times)</math> width <math>\times</math> length. Allow <math>4 \times</math> width <math>\times</math> length or equivalent for S1. May be implied in later working if B2 or B1 awarded.</p> <p>Mark final answer for B2. Allow <math>20x^2 + 2x - 6</math> for B2.</p> <p>Award B1 for sight of one of the following:</p> <ul style="list-style-type: none"> <li>• <math>20x^2 + 12x - 10x - 6</math> with at least three terms out of the four correct (must have <math>x^2</math> term)</li> <li>• <math>10x^2 + 6x - 5x - 3</math></li> <li>• <math>2(10x^2 + x - 3)</math></li> <li>• <math>10x^2 + x - 3</math></li> <li>• <math>40x^2 + 4x - 12</math>.</li> </ul> <p>If no marks, award SC1 for one of the following:</p> <ul style="list-style-type: none"> <li>• <math>40x^2 + 24x - 20x - 12</math>.</li> <li>• <math>20x^2 + 22x + 6</math> from <math>2(5x + 3)(2x + 1)</math></li> <li>• <math>20x^2 - 2x - 6</math> from <math>2(5x - 3)(2x + 1)</math></li> <li>• <math>20x^2 - 22x + 6</math> from <math>2(5x - 3)(2x - 1)</math>.</li> </ul>
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Unit 1: Intermediate Tier	Mark	Comments
9(a)(i) $1 \times 10^5$	B1	
9(a)(ii) A suitable calculation, including an <u>appropriate</u> approximation, e.g. $\frac{3\ 100\ 000}{21\ 000}$ or $\frac{3\ 100\ 000}{20\ 000}$ or $\frac{3\ 000\ 000}{20\ 000}$ or $\frac{3\ 000\ 000}{21\ 000}$ or equivalent  Answer in the range 142 (people/km <sup>2</sup> ) to 155 (people/km <sup>2</sup> )	M2          A1	Place value must be correct Must include an approximation  M1 for the idea to divide (in the correct order), that may also include one place value error, e.g. $\frac{3.1\ million}{20\ 735}$ , $\frac{31\ 000\ 000}{20\ 000}$ , $\frac{3\ 100\ 000}{20\ 700}$  ISW. Allow 142.8, 142.9 and 143 rounded to 140 Accept equivalents, e.g. 150 written as $1.5 \times 10^2$
9(b) Idea that 360 000 is 120%  $360\ 000 \div 1.2$ or equivalent 300 000 (people)	B1   M1 A1	Accept from sight of trial to increase 'their value' by 20% provided 'their value' <360 000  Award of M1 also implies previous B1
9(c) (Length) $6.6 \div (4.2 \div 1.4)$ or $6.6 \div 3$ or equivalent Length 2.2 (cm)  (Height) $4.2 \times (9.9 \div 6.6)$ or $4.2 \times 1.5$ or $1.4 \times (9.9 \div 2.2)$ or equivalent Height 6.3 (cm)	M1  A1  M1  A1	FT $1.4 \times (9.9 \div \text{'their derived length'})$  Note: Length (from $9.9 - 6.6 =$ ) 3.3(cm) M0 A0 Height (from $1.4 \times (9.9 \div 3.3) =$ ) 4.2(cm) M1 A1 (FT)  Allow answers reversed in the answer space
9(c) <u>Alternative method</u> (Height) $4.2 \times (9.9 \div 6.6)$ or $4.2 \times 1.5$ or equivalent Height 6.3 (cm)  (Length) $6.6 \div (4.2 \div 1.4)$ or $6.6 \div 3$ or $9.9 \div (6.3 \div 1.4)$ or equivalent Length 2.2 (cm)	M1  A1  M1  A1	FT $9.9 \div (\text{'their derived height'} \div 1.4)$  Allow answers reversed in the answer space

19.(a) $\frac{x}{13.3} = \frac{5.2}{3.8}$ or $\frac{x}{5.2} = \frac{13.3}{3.8}$ or equivalent $x = 18.2$	M1 A1	M1 for <u>correct</u> use of scale factor 3.5 or equivalent e.g. $x = 5.2 \times \frac{7}{2}$ An unsupported answer of 18.2 is awarded M1A1.
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19.(b)

A and C

Valid correct reason e.g.

- For each (of A and C) the length is 1.5 times the width
- For each (of A and C) the length is  $\frac{3}{2}$  times the width
- For each (of A and C) the width is  $\frac{2}{3}$  times the length
- The scale factor (of enlargement from A to C) is 2.5 (or equivalent)
- The scale factor (of enlargement from C to A) is 0.4 (or equivalent)
- The sides are in equal ratios  
e.g.  $\frac{15}{6} = \frac{10}{4}$  (= 2.5) OR  $\frac{6}{4} = \frac{15}{10}$  (= 1.5)  
or equivalent inverse ratios shown to be equal
- The (corresponding) lengths and widths are in the same ratio of 5 : 2
- The ratio of the length to the width is 3 : 2 (for each of the rectangles A and C)
- $6 \times 2.5 = 15\text{cm}$   $4 \times 2.5 = 10\text{cm}$ .

B1

Answer line takes precedence.

E1

Dependent on B1.

Allow:

Both width and height increase by a factor of 2.5

Do not allow:

They have the same scale factor

The scale factor is 1.5

The scale factor is 3 : 2.

<p>9(a) (Length of the flagpole below the rod =)</p> $3.8 \times \sin 55^\circ \quad \text{or} \quad 3.8 \times \cos (90^\circ - 55^\circ)$ $\text{or } 380 \times \sin 55^\circ \quad \text{or} \quad 380 \times \cos (90^\circ - 55^\circ)$ <p style="text-align: center;">3.11(2...m) or 311(.2.. cm)</p> <p>(Total length 1.5 + 3.11 =) 4.61 (m) or 461 (cm)</p>	<p>M2</p> <p>A1</p> <p>A1</p>	<p>Or alternative full method</p> <p>M1 for correct working without isolating 'length'</p> $\sin 55^\circ = \frac{\text{length}}{3.8} \quad \text{or} \quad \cos (90^\circ - 55^\circ) = \frac{\text{length}}{3.8}$ $\text{or } \sin 55^\circ = \frac{\text{length}}{380} \quad \text{or} \quad \cos (90^\circ - 55^\circ) = \frac{\text{length}}{380}$ <p>Allow 3.1 (m) or 310 (cm)</p> <p>Must be to the nearest cm</p> <p>FT provided at least M1 previously awarded, i.e. for 1.5 + 'their 3(.11)' correctly evaluated, to nearest cm, <u>and</u> 'their 3.11' is to at least 2 decimal places</p> <p>If units are given they must be correct</p>
<p>9(b)(i) <math>120 \times 64 \div 80</math> or <math>64 \times 1.5</math> or <math>120 \times 0.8</math></p> <p>or <math>120 \div 1.25</math> or <math>64 \div \frac{2}{3}</math> or equivalent</p> <p style="text-align: center;">96 (cm)</p>	<p>M1</p> <p>A1</p>	<p>Answer space takes precedence</p>
<p>9(b)(ii) <math>75 \times 80 \div 120</math> or <math>75 \div 1.5</math> or <math>75 \times \frac{2}{3}</math></p> <p>or <math>80 \div 1.6</math> or <math>80 \times 0.625</math> or <math>64 \times 75 \div 96</math></p> <p>or equivalent</p> <p style="text-align: center;">50 (cm)</p>	<p>M1</p> <p>A1</p>	<p>FT from (b)(i) <math>64 \times 75 \div</math> 'their 96' or equivalent</p> <p>Answer space takes precedence</p>

14. $(w =) 18 \cdot 9 \times \frac{6}{9}$ OR $\frac{w}{18 \cdot 9} = \frac{6}{9}$ or equivalent  OR $(w =) 18 \cdot 9 \div \frac{9}{6}$ OR $\frac{18 \cdot 9}{9} = \frac{w}{6}$ or equivalent  $w = 12 \cdot 6$	M1          A1	May be seen in stages. M1 for <u>correct use</u> of scale factor $\frac{2}{3}$ or equivalent.          An unsupported answer of 12·6 is awarded M1A1.
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*End of solutions*