

REVISE

.wales

2.02 – Primes, factors, LCM & HCF

Mark schemes for the 2.02 question pack

Spec 1.2.1, 1.2.2, 1.2.3 – Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 17 questions in the corresponding revise.wales question pack (77 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

<p>3.(a) For a method that produces 2 prime factors from the set {2, 2, 5, 5, 7} before the 2nd error.</p> <p style="text-align: center;">2, 2, 5, 5, 7</p> <p style="text-align: center;">$2^2 \times 5^2 \times 7$</p>		<p>M1</p> <p>A1</p> <p>B1</p>	<p>Allow ± '1 small square'.</p> <p>C.A.O. For sight of the five correct factors (Ignore 1s)</p> <p>F.T. 'their primes' provided at least one index form used with at least a square.</p> <p>Do not F.T. non-primes.</p> <p>Allow $(2^2)(5^2)(7)$ and $2^2.5^2.7$</p> <p>Do not allow $2^2, 5^2, 7$.</p> <p>Inclusion of 1 as a factor gets B0.</p>
<p>3.(b) Any reference to the index being an odd number.</p>		<p>E1</p>	<p>Do not accept ... (should be 2^{24} ...)</p>

5.	7	3	✓✓ ✓	B3	B2 for 5. B1 for 4 or 6 or 8 or 9 If no marks awarded allow SC1 for 11 or 13 or 17.
			✓	OC1	For OC1, candidates will be expected to: <ul style="list-style-type: none">• present their response in a structured way• explain to the reader what they are doing at each step of their response• lay out their explanation and working in a way that is clear and logical

5. (LCM of 12, 18 and 24 =) 72 or equivalent, e.g. $2 \times 2 \times 2 \times 3 \times 3$.	B2	B1 for any other common multiple <u>identified</u> . e.g 144, 432, 5184 etc.
(HCF of 36 and 54 =) 18 or equivalent, e.g. $2 \times 3 \times 3$.	B2	B1 for any other common factor <u>identified</u> . i.e. 2, 3, 6, 9. Do not accept 1.
(72 ÷ 18 =) 4	B1	F.T. only if <u>at least one B2 gained</u> . B0 for 72/18. Unsupported 4 gains 5 marks.

<p>11(a) $200\pi = \frac{40}{360} \times \pi \times \text{radius}^2$ $\text{radius}^2 = \frac{200\pi \times 360}{40\pi}$ or equivalent (radius =) $\sqrt{1800}$ Writing 1800 or as a product of 2 or more factors</p> <p style="text-align: center;">$30\sqrt{2}$ (m)</p>	<p>M1 A1 A1 M1 A1</p>	<p>CAO e.g. $\sqrt{1800} = \sqrt{18} \times \sqrt{100}$, or $\sqrt{1800} = \sqrt{3} \times \sqrt{6} \times \sqrt{100}$, or $1800 = 900 \times 2$ FT 'their 1800' provided previous M1 awarded Needs to be in the form $a\sqrt{b}$ where b is a prime number</p>
<p>11(b) $(10 + 30\sqrt{2})^2$</p> <p style="text-align: center;">$100 + 300\sqrt{2} + 300\sqrt{2} + 1800$ $= 1900 + 600\sqrt{2}$ (m²)</p>	<p>M1 A1 A1</p>	<p>FT for all marks 'their $30\sqrt{2}$' provided of equivalent difficulty i.e $a\sqrt{b}$, where b does <u>not</u> need to be a prime number</p> <p>Allow A1 for any 3 correct terms Accept e.g. $100(19 + 6\sqrt{2})$ (m²) Mark final answer</p>

4.(a)	225	B2	<ul style="list-style-type: none">• use appropriate terminology, units, etc. Mark final answer. Allow $\sqrt{225}$ (= 15) as an indication of correct answer and award B2. B1 for unambiguous indication that HCF is 15. B1 only for 15^2 if not shown to be 225.
4.(b)	9·6	B2	Mark final answer. B1 for sight of 3·2.

4.	70	B3	B2 for 77 OR 80 B1 for any number between 65 and 79 inclusive, apart from 70(B3) and 77(B2) B1 for 56, 60 OR 63
----	----	----	--

<p>12(a) (Half base diagonal² =) $7^2 + 7^2$ OR Half base diagonal² = 98 OR (Half base diagonal =) $\sqrt{98}$ OR Half base diagonal = $\frac{1}{2}\sqrt{14^2 + 14^2}$</p> <p>(Slant edge =) $\sqrt{98 + 8^2}$ OR $\sqrt{7^2 + 7^2 + 8^2}$</p> <p>Slant edge = $\sqrt{162}$</p> <p style="text-align: center;">$= 9\sqrt{2}$</p>	<p>M1</p> <p>M2</p> <p>A1</p> <p>B2</p>	<p>Allow M1 for an appropriate $7^2 + 8^2$ OR 113 OR $\sqrt{113}$</p> <p>M1 for $98 + 8^2$ OR $7^2 + 7^2 + 8^2$</p> <p>CAO</p> <p>For B2, FT 'their derived 162' provided their 'b' is a prime number</p> <p>For B1, FT 'their derived 162'</p> <p>B1 for writing 162 as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a square number e.g. 2×81, $3 \times 3 \times 18$, OR B1 for writing $\sqrt{162}$ as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a whole number e.g. $\sqrt{2} \times \sqrt{9} \times \sqrt{9}$</p>
<p>12(b) (Area factor =) $\left(\frac{160}{8}\right)^2$ or equivalent</p> <p style="text-align: center;">$= 400$</p> <p>(Area of glass =) 400×74</p> <p style="text-align: center;">$= 29600 \text{ (cm}^2\text{)}$</p>	<p>M2</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>M1 for $\frac{160}{8}$ or equivalent OR sight of 20 8</p> <p>OR M1 for $\left(\frac{160}{8}\right)^2$ with place value errors e.g. 2^2 or 0.04</p> <p>CAO. May be implied in further working</p> <p>FT 'their $\left(\frac{160}{8}\right)^2$', or 'their $\left(\frac{1.6}{8}\right)^2$', Must be from an area scale factor</p> <p>CAO</p>

Unit 1: Higher tier		
<p>1.(a) For a method that produces 2 prime factors from the set {3, 3, 5, 7} before the 2nd error.</p> <p style="text-align: center;">3, 3, 5, 7</p> <p style="text-align: center;">$3^2 \times 5 \times 7$</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>C.A.O. For sight of the four correct factors (ignore 1s)</p> <p>FT 'their primes' provided at least one index form used with at least a square.</p> <p>Allow $(3^2)(5)(7)$ and $3^2.5.7$</p> <p>Inclusion of 1 as a factor gets B0.</p>
<p>1.(b) $42 = 2 \times 3 \times 7$ or equivalent correct strategy.</p> <p style="text-align: center;">(HCF =) 21</p>	<p>M1</p> <p>A1</p>	<p>M1 for sight of 2, 3, 7 'together'. (Not for 2×21, 3×14 and 6×7.) (Not for <u>just</u> listing all factors 1,2,3,6,7,14,21.)</p> <p>M1A0 for 3×7.</p> <p>FT 'their answer to 1(a)' only if of equivalent difficulty (at least two common prime factors)</p>

<p>3. For a correct method that produces 2 prime factors from the set {3, 3, 5, 5, 7} before the 2nd error.</p> <p>3, 3, 5, 5, 7</p> <p>$3^2 \times 5^2 \times 7$</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>Must be a method that involves only division</p> <p>CAO for sight of the five correct factors (ignore 1s)</p> <p>Do not FT non-primes.</p> <p>FT 'their <u>primes</u>' provided at least one index form used with at least a square.</p> <p>Allow $(3^2)(5^2)(7)$ and $3^2.5^2.7$</p> <p>Do not allow $3^2, 5^2, 7$.</p> <p>Inclusion of 1 as a factor gets B0.</p>
---	-------------------------------	---

<p>2.(a) For a single method that produces 2 prime factors from the set {3, 3, 3, 5, 5} before the 2nd error.</p> <p style="text-align: center;">3, 3, 3, 5, 5</p> <p style="text-align: center;">$3^3 \times 5^2$</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set. (Note $675 = 5 \times 135$ $675 = 3 \times 225$ $135 = 5 \times 27$ $135 = 3 \times 45$)</p> <p>CAO. For sight of the five correct factors (Ignore 1s)</p> <p>Do not FT non-primes. FT '<u>their primes</u>' provided at least one index form used with at least a square. Allow $(3^3)(5^2)$ and $3^3 \cdot 5^2$ and $3^3 5^2$ Do not allow $3^3, 5^2$ Inclusion of 1 as a factor gets B0.</p>
<p>2.(b) 10</p>	<p>B1</p>	<p>Do not accept 2×5.</p>

4.(a)	1·2	B2	Mark final answer. Award B1 for one of the following: <ul style="list-style-type: none">• sight of $1\cdot1(5519\dots)$.• an answer of $1\cdot20$. Do not award B2 or B1 for answers obtained from incorrect work (e.g. rounding and/or estimating).
4.(b)	0·043	B2	Mark final answer. Award B1 for sight of one of the following: <ul style="list-style-type: none">• $\frac{1}{23}$• $1 \div 23$• $0\cdot0434(\dots)$• $0\cdot0435$• $0\cdot04$.
4.(c)(i)	12	B1	
4.(c)(ii)	5	B1	

<p>13.(a) $\frac{4}{4} \times \frac{3}{5} \times \frac{2}{6}$ $= \frac{18}{120}$ ISW (= $\frac{3}{20}$ or 0.15) oe</p>	<p>M1</p>	<p>A1 If no marks, award SC1 for: $\frac{a}{4} \times \frac{b}{5} \times \frac{c}{6}$ correctly evaluated with at least two of a, b and c correct OR an answer of $\frac{48}{120}$ (= $\frac{2}{5}$ or 0.4 or equivalent) from assuming that 1 is prime, $\frac{3}{4} \times \frac{4}{5} \times \frac{4}{6}$ OR an answer of $\frac{4}{120}$ (= $\frac{1}{30}$ or 0.03(3...) or equivalent) from excluding 2 as prime, $\frac{1}{4} \times \frac{2}{5} \times \frac{2}{6}$</p>
<p>13.(b) $[1 - P(1, 1, 1) - 3 \times P(1, 1, 2) =]$</p> <p>$1 - 4 \times \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ OR $\frac{120-4}{120}$</p> <p>$= \frac{116}{120}$ ISW (= $\frac{29}{30}$) oe</p>	<p>M2</p>	<p>Award M1 for sight of:</p> <ul style="list-style-type: none"> $4 \times \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ or equivalent (from $P(1, 1, 1) + 3 \times P(1, 1, 2)$) OR $1 - 2 \times \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ or equivalent (from $1 - P(1, 1, 1) - P(1, 1, 2)$) OR $1 - 3 \times \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ or equivalent (from $1 - 3 \times P(1, 1, 2)$) OR $1 - \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$ or equivalent (from $1 - P(1, 1, 1)$), note: this may include further incorrect work, e.g. $\frac{117}{120}$ (= $\frac{39}{40}$) from $1 - \frac{1}{4} \times \frac{1}{5} \times \frac{1}{6} - \frac{1}{4} \times \frac{1}{5} \times \frac{2}{6}$ or equivalent OR 120-4 (120 permutations – the 4 permutations not allowed) <p>A1 CAO Allow 0.96 OR 0.966(6...) OR 0.967 oe. Allow 0.97 from correct working.</p> <p>If no marks award SC1 for an answer of $\frac{114}{120}$ (= $\frac{19}{20}$) from $1 - 3 \times P(1, 1, 1) - 3 \times P(1, 1, 2)$</p> <p>*Note: award M2 for a <u>fully correct</u> method of listing all the ways leading to totals greater than 4, but M0 for a partial attempt</p>

<p>4. (a) For a correct method that produces 2 prime factors from the set {3,3,5,11} before 2nd error.</p> <p style="text-align: center;">3, 3, 5, 11</p> <p style="text-align: center;">$3^2 \times 5 \times 11$</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set. (Note: $495 = 3 \times 165$ $495 = 5 \times 99$ $495 = 11 \times 45$)</p> <p>CAO For sight of the four correct factors (Ignore 1s).</p> <p>Do not FT non-primes. FT <u>'their primes'</u> provided at least one index form used with at least a square. Allow $(3^2)(5)(11)$ and $3^2.5.11$ Do not allow $3^2,5,11$ Inclusion of 1 as a factor gets B0.</p>
<p>4. (b) Any valid reason referring to not all the indices being even e.g "the powers are not (all) even" "only one index is even"</p>	<p>E1</p>	<p>Allow reference to $22^2 = 484$ and $23^2 = 529$</p> <p>Do not accept "they are not (all) even" "all factors are not (all) even" "the 5 and 11 are not squared" "the prime factors are all odd" "the little numbers are not even".</p>
<p>4. (c) $60 = 2 \times 2 \times 3 \times 5$ or equivalent correct strategy</p> <p style="text-align: center;">(HCF =) 15</p>	<p>M1</p> <p>A1</p>	<p>M1 for sight of 2,2,3,5 'together' Allow M1 for selection of $2 \times 2 \times 15$ or 4×15 (Not for other products e.g. 2×30, 3×20, 5×12, 6×10) (Not for just listing all the factors 1,2,3,4,5,6,10,12,15,20,30,60)</p> <p>Mark final answer. M1A0 for 3×5 FT 'their answer to 4(a)' only if equivalent difficulty (at least two common prime factors). Unsupported 15 gains M1 A1.</p> <p>If no marks awarded, award SC1 for sight of all common factors (1, 3, 5 and 15) and no other factors.</p>

3. For a correct method that produces 2 prime factors from the set {3,3,3,5,7} before 2 nd error.	M1	Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set.
3, 3, 3, 5, 7	A1	CAO. For sight of the five correct factors (Ignore 1s) with no other terms (if tree method used, use ends of branches).
$3^3 \times 5 \times 7$	B1	FT 'their primes' provided at least one index form used with at least a square. Do not FT non-primes. Allow $(3^3)(5)(7)$ or $3^3.5.7$ Do not allow $3^3,5,7$. Inclusion of 1 as a factor gets B0.

