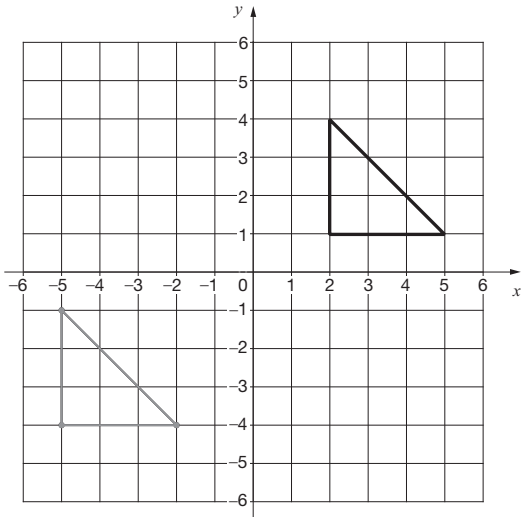
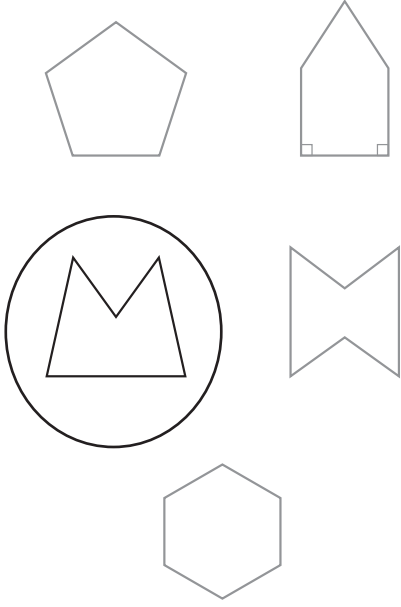


## 9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance																
1	10	1m																	
2	5	1m																	
3	$95 \times 6$ OR $96 \times 5$	1m																	
4a	7	1m	<b>Do not</b> accept $-7$ or $7-$																
4b	$-2$	1m	<b>Do not</b> accept $2-$																
5	£302.27	1m																	
6	<p>The correct time circled as shown:</p> <table border="1"> <thead> <tr> <th>Leaves London</th> <th>Arrives Paris</th> </tr> </thead> <tbody> <tr> <td>12:01</td> <td>15:22</td> </tr> <tr> <td>12:25</td> <td>15:56</td> </tr> <tr> <td>13:31</td> <td>16:53</td> </tr> <tr> <td>14:01</td> <td>17:26</td> </tr> <tr> <td>14:31</td> <td>17:53</td> </tr> <tr> <td>15:31</td> <td>18:53</td> </tr> <tr> <td>16:01</td> <td>19:20</td> </tr> </tbody> </table>	Leaves London	Arrives Paris	12:01	15:22	12:25	15:56	13:31	16:53	14:01	17:26	14:31	17:53	15:31	18:53	16:01	19:20	1m	<p>Accept alternative unambiguous positive indications, e.g. 14:01 ticked or underlined.</p> <p>Accept 17:26 circled in addition to 14:01, provided no other time is circled.</p> <p><b>Do not</b> accept only the arrival time 17:26 circled.</p>
Leaves London	Arrives Paris																		
12:01	15:22																		
12:25	15:56																		
13:31	16:53																		
14:01	17:26																		
14:31	17:53																		
15:31	18:53																		
16:01	19:20																		
7	<p>Triangle with vertices at (2,1) <b>AND</b> (2,4) <b>AND</b> (5,1) drawn on the grid as shown:</p> 	1m	Accept slight inaccuracies in drawing (see page 12 for guidance).																

Qu.	Requirement	Mark	Additional guidance
8	<p>Award <b>TWO</b> marks for any three of the following numbers written in any order:</p> <ul style="list-style-type: none"> <li>• 2</li> <li>• 6</li> <li>• 10</li> <li>• 30</li> </ul> <p>If the answer is incorrect, award <b>ONE</b> mark for two numbers correct.</p>	Up to 2m	
9	5	1m	<b>Do not</b> accept 300 (minutes).
10	68 (ml) <b>OR</b> 0.068 (l)	1m	<b>Do not</b> accept incorrect units, e.g. 68l <b>OR</b> 0.068 ml.
11	32	1m	
12	<p>An explanation that shows Adam has four times as many balloons as Chen, e.g.</p> <ul style="list-style-type: none"> <li>• <math>24 \times 6</math> is 4 times as many as <math>12 \times 3</math></li> <li>• 144 is four times 36</li> <li>• <math>144 \div 4 = 36</math></li> <li>• <math>144 \div 36 = 4</math></li> <li>• <math>36 \times 4 = 144</math></li> <li>• Adam buys twice as many bags of twice as many balloons, so it's doubled twice</li> <li>• 24 is double 12 and 6 is double 3, so it's doubled twice</li> <li>• Chen buys half the amount of bags and each bag has half the number of balloons, so he has <math>\frac{1}{4}</math> of the amount.</li> </ul>	1m	<p><b>Do not</b> accept vague or incomplete explanations, e.g.</p> <ul style="list-style-type: none"> <li>• Adam buys more bags and there are more balloons in each bag</li> <li>• Adam buys twice as many bags of twice as many balloons</li> <li>• 24 is double 12 and 6 is double 3.</li> </ul>

Qu.	Requirement	Mark	Additional guidance
13	<p>The correct shape circled as shown:</p> 	1m	Accept alternative unambiguous positive indications, e.g. shape ticked.
14	<p>Award <b>TWO</b> marks for the correct answer of £0.90</p> <p>If the answer is incorrect, award <b>ONE</b> mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> <li>• <math>£1.35 \times 2 = £2.70</math> <math>£2.70 \div 3</math></li> </ul>	Up to 2m	<p>Accept for <b>ONE</b> mark an answer of £90p <b>OR</b> £0.9 as evidence of an appropriate method.</p> <p>Answer need not be obtained for the award of <b>ONE</b> mark.</p>
15	<p>The correct letter circled as shown:</p> <p>A C <b>E</b> L Z</p>	1m	Accept alternative unambiguous positive indications, e.g. letter ticked.
16	<p>Award <b>TWO</b> marks for the correct answer of 750</p> <p>If the answer is incorrect, award <b>ONE</b> mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> <li>• <math>450 \times 2 = 900</math> <math>2,400 - 900 = 1,500</math> <math>1,500 \div 2</math></li> </ul>	Up to 2m	Answer need not be obtained for the award of <b>ONE</b> mark.

Qu.	Requirement	Mark	Additional guidance
17	<p>Award <b>TWO</b> marks for all four rows completed correctly as shown:</p> <div style="display: flex; flex-direction: column; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; display: flex; gap: 20px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;"><math>1\frac{1}{2}</math></div> <div>1.2</div> </div> <div style="border: 1px solid black; padding: 5px; display: flex; gap: 20px;"> <div><math>1\frac{1}{4}</math></div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">1.3</div> </div> <div style="border: 1px solid black; padding: 5px; display: flex; gap: 20px;"> <div><math>1\frac{5}{100}</math></div> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;">1.4</div> </div> <div style="border: 1px solid black; padding: 5px; display: flex; gap: 20px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px;"><math>1\frac{3}{5}</math></div> <div>1.5</div> </div> </div> <p>If the answer is incorrect, award <b>ONE</b> mark for three rows completed correctly.</p>	Up to 2m	Accept alternative unambiguous positive indications of the correct numbers, e.g numbers ticked.
18	<p>Both numbers correct as shown:</p> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">9</div> <div>+</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">13</div> <div>= 22</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;">square number</div> <div style="text-align: center;">prime number</div> </div>	1m	<p>Numbers must be in the correct order.</p> <p><b>Do not accept:</b></p> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"><math>3^2</math></div> <div>+</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">13</div> <div>= 22</div> </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;">square number</div> <div style="text-align: center;">prime number</div> </div>
19	<p>Award <b>TWO</b> marks for 12 <b>AND</b> 13</p> <p>If the answer is incorrect, award <b>ONE</b> mark for:</p> <ul style="list-style-type: none"> <li>only one correct number and no incorrect number</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>12 <b>AND</b> 13 <b>AND</b> not more than one incorrect number.</li> </ul>	Up to 2m	Accept for <b>ONE</b> mark an answer of 48 <b>AND</b> 52 <b>AND</b> no more than one incorrect number.

Qu.	Requirement	Mark	Additional guidance
20	<p>Award <b>THREE</b> marks for the correct answer of 14</p> <p>If the answer is incorrect, award <b>TWO</b> marks for:</p> <ul style="list-style-type: none"> <li>• sight of 414 as evidence of <math>23 \times 18</math> completed correctly</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• evidence of an appropriate method with no more than one arithmetic error, e.g.</li> </ul> $20 \times 20 = 400$ $\begin{array}{r} 23 \\ \times 18 \\ \hline 230 \\ 184 \\ \hline 314 \text{ (error)} \end{array}$ $400 - 314 = 86$ <p>Award <b>ONE</b> mark for evidence of an appropriate method.</p>	Up to 3m	<p>Answer need not be obtained for the award of <b>ONE</b> mark.</p> <p>A misread of a number may affect the award of marks. No marks are awarded if there is more than one misread or if the mathematics is simplified.</p> <p><b>TWO</b> marks will be awarded for an appropriate method using the misread number followed through correctly to a final answer.</p> <p><b>ONE</b> mark will be awarded for evidence of an appropriate method using the misread number followed through correctly with no more than one arithmetic error.</p>

Qu.	Requirement	Mark	Additional guidance
21a	$\frac{3}{8}$ written in the first box	1m	Accept equivalent fractions or an <b>exact</b> decimal equivalent, e.g. 0.375
21b	$2\frac{7}{8}$ OR $\frac{23}{8}$ written in the last box	1m	Accept equivalent fractions or an <b>exact</b> decimal equivalent, e.g. 2.875
22	<p>Award <b>TWO</b> marks for the correct answer of 7</p> <p>If the answer is incorrect, award <b>ONE</b> mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> <li><math>18 + 9 + 2</math> widths = <math>34 + 1</math> width</li> <li><math>27 + 2</math> widths = <math>34 + 1</math> width</li> <li><math>27 + 1</math> width = 34</li> <li><math>34 - 27</math></li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li><math>34 - (18 + 9)</math></li> </ul>	Up to 2m	<p>Answer need not be obtained for the award of <b>ONE</b> mark.</p> <p>Award <b>ONE</b> mark for a method which uses algebraic representation correctly, e.g.</p> <ul style="list-style-type: none"> <li><math>34 + w = 18 + w + 9 + w</math></li> <li><math>34 + w = 27 + w + w</math></li> </ul>
23	<p>Both numbers correct as shown:</p> $b = \boxed{10} \times a - \boxed{1}$	1m	
24	<p>Award <b>TWO</b> marks for the correct answer of 9</p> <p>If the answer is incorrect, award <b>ONE</b> mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> <li><math>6 \times 6 \times 6 = 216</math></li> <li><math>216 \div 6 = 36</math></li> <li><math>36 \div 4</math></li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li><math>216 \div 24</math></li> </ul>	Up to 2m	Answer need not be obtained for the award of <b>ONE</b> mark.