

9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance
1	8	1m	
2	<p>Award ONE mark for all multiplications completed correctly with the given cards, as shown:</p> $24 = \boxed{3} \times \boxed{8}$ $28 = \boxed{4} \times \boxed{7}$ $30 = \boxed{5} \times \boxed{6}$	1m	<p>Accept for each multiplication the numbers given in either order, e.g.</p> 8×3 7×4 6×5
3	<p>Award TWO marks for the correct answer of 15(p)</p> <p>If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> $30p + 45p + 60p = 135p$ $50p \times 3 = 135p$ <p>OR</p> <ul style="list-style-type: none"> $50 - 30 = 20$ $50 - 45 = 5$ $20 + 5 + 50 = 75$ $75 - 60$ <p>OR</p> <ul style="list-style-type: none"> $150 - 45 = 95$ (<i>error</i>) $95 - 60 = 35$ $35 - 30$ 	Up to 2m	<p>Answer need not be obtained for the award of ONE mark.</p> <p>Accept for ONE mark an answer of 0.15(p) OR £15(p) as evidence of an appropriate method.</p> <p>Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.</p>

Qu.	Requirement	Mark	Additional guidance
4	<p>Award TWO marks for all four fractions matched to the correct decimal as shown:</p> <p>Award ONE mark for three fractions and decimals matched correctly.</p>	Up to 2m	<p>Lines need not touch the boxes, provided the intention is clear.</p> <p>Do not accept any fraction that has been matched to more than one decimal number.</p>
5	<p>Award TWO marks for the correct answer of 123</p> <p>If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> • $87 + 154 + 38 = 279$ $402 - 279$ <p>OR</p> <ul style="list-style-type: none"> • $87 + 154 + 38 = 269$ (<i>error</i>) $402 - 269$ 	Up to 2m	Answer need not be obtained for the award of ONE mark.
6a	-7	1m	Do not accept 7-
6b	8	1m	Do not accept -8

Qu.	Requirement	Mark	Additional guidance
7	<p>Award TWO marks for the correct answer of 81,572</p> <p>Award ONE mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> • $\begin{array}{r} 80,978 \\ + 72,319 \\ \hline 153,297 \end{array}$ <p style="margin-left: 40px;">$234,869 - 153,297$</p> <p>OR</p> <ul style="list-style-type: none"> • $\begin{array}{r} 234,869 \\ - 80,978 \\ \hline 153,891 \end{array}$ <p style="margin-left: 40px;">$153,891 - 72,319$</p> <p>OR</p> <ul style="list-style-type: none"> • $\begin{array}{r} 234,869 \\ - 72,319 \\ \hline 162,550 \end{array}$ <p style="margin-left: 40px;">$162,550 - 80,978$</p> <p>OR</p> <p>Award ONE mark for sight of 153,297 OR 153,891 OR 162,550</p>	Up to 2m	Answer need not be obtained for the award of ONE mark.
8	<p>Award TWO marks for the correct three numbers, as shown:</p> <p style="margin-left: 40px;">to the nearest 1,000 8,000</p> <p style="margin-left: 40px;">to the nearest 100 7,500</p> <p style="margin-left: 40px;">to the nearest 10 7,550</p> <p>If the answer is incorrect, award ONE mark for any two of the numbers rounded correctly.</p>	Up to 2m	Do not accept 500 or 50 for the second and third entries.

Qu.	Requirement	Mark	Additional guidance
9	41,600	1m	
10	<p>Award TWO marks for the correct answer of 79(p) OR (£)0.79</p> <p>If the answer is incorrect, award ONE mark for an appropriate method, e.g.</p> <ul style="list-style-type: none"> • $£4.75 - £1.98 = £2.77$ $£2.77 - £1.98$ <p>OR</p> <ul style="list-style-type: none"> • $198 \times 2 = 397\text{p}$ (<i>error</i>) $£4.75 - 397\text{p}$ <p>OR</p> <ul style="list-style-type: none"> • $£2 \times 2 = £4$ $£4.75 - £4 = 75\text{p}$ $75\text{p} + 4\text{p}$ 	Up to 2m	<p>Answer need not be obtained for the award of ONE mark.</p> <p>Accept for ONE mark an answer of 0.79p OR £79(p) as evidence of a correct method.</p> <p>Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.</p>
11	<p>Award ONE mark for:</p> <p>21 OR 22 OR 23 OR 24</p>	1m	<p>Award ONE mark for more than one correct answer given and there are no incorrect answers.</p> <p>Do not accept decimal numbers.</p>
12a	136	1m	
12b	310 OR -90	1m	
13	$\frac{1}{6}$	1m	<p>Accept equivalent fractions or an exact decimal equivalent, e.g. $0.1\dot{6}$ (accept any unambiguous indication of the recurring digits).</p> <p>Do not accept rounded or truncated decimals.</p>
14	£77.50	1m	Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
15a	90	1m	
15b	B	1m	Accept alternative unambiguous indication of the correct answer.

Qu.	Requirement	Mark	Additional guidance										
16	<p>Award TWO marks for three boxes ticked correctly, as shown:</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">$\frac{1}{4}$</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">$\frac{2}{5}$</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">$\frac{4}{10}$</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">$\frac{6}{10}$</td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;">$\frac{40}{100}$</td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table> <p>If the answer is incorrect, award ONE mark for:</p> <ul style="list-style-type: none"> • only two boxes ticked correctly and no incorrect boxes ticked. <p>OR</p> <ul style="list-style-type: none"> • three boxes ticked correctly and one incorrect box ticked. 	$\frac{1}{4}$	<input type="checkbox"/>	$\frac{2}{5}$	<input checked="" type="checkbox"/>	$\frac{4}{10}$	<input checked="" type="checkbox"/>	$\frac{6}{10}$	<input type="checkbox"/>	$\frac{40}{100}$	<input checked="" type="checkbox"/>	Up to 2m	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.
$\frac{1}{4}$	<input type="checkbox"/>												
$\frac{2}{5}$	<input checked="" type="checkbox"/>												
$\frac{4}{10}$	<input checked="" type="checkbox"/>												
$\frac{6}{10}$	<input type="checkbox"/>												
$\frac{40}{100}$	<input checked="" type="checkbox"/>												
17	<p>Award TWO marks for the correct answer of 108</p> <p>If the answer is incorrect, award ONE mark for an appropriate method, e.g.</p> <ul style="list-style-type: none"> • $7.5 \times 4 = 30$ $11 \times 4 = 44$ $8.5 \times 4 = 34$ $30 + 44 + 34$ <p>OR</p> <ul style="list-style-type: none"> • $7.5 + 11 + 8.5 = 27$ 27×4 <p>OR</p> <ul style="list-style-type: none"> • $7.5 + 7.5 + 7.5 + 7.5 + 11 + 11 + 11 + 11$ $+ 8.5 + 8.5 + 8.5 + 8.5$ 	Up to 2m	<p>Misreads are not allowed.</p> <p>Answer need not be obtained for the award of ONE mark.</p>										

Qu.	Requirement	Mark	Additional guidance
18	<p>Award TWO marks for the correct answer of (£)10.50</p> <p>If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.</p> <ul style="list-style-type: none"> $70 \times 15 \div 100$ <p>OR</p> <ul style="list-style-type: none"> $10 \times 15 \div 100 = \text{£}1.50$ $3 \times \text{£}1.50 = \text{£}4.50$ $\text{£}15 - \text{£}4.50$ <p>OR</p> <p>Award ONE mark for sight of (£)4.50</p>	Up to 2m	<p>Answer need not be obtained for the award of ONE mark.</p> <p>Award ONE mark for a final answer of (£)10.5 OR (£)105 OR (£)1050 as evidence of an appropriate method.</p> <p>Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.</p>
19	<p>Award ONE mark for a correct explanation, e.g.</p> <ul style="list-style-type: none"> It has 3 factors – the prime number, 1 and the square of the prime number. The prime number has 2 factors; the squared prime number will be divisible by one, itself and the prime number. All prime numbers squared have 3 factors. <p>OR</p> <p>A correct explanation that gives a counter example, e.g.</p> <ul style="list-style-type: none"> 5 is prime $5^2 = 25$ 25 has 3 factors: 1, 5 and 25, not two 7^2 has more than 2 factors – 1, 7 and 49 $121 = 1 \times 121 = 11 \times 11$ $3^2 = 9$ 9 – 1, 9, 3 $5^2 = 25$ Factors of 25 = 1, 5, 25 All squared primes have 3 factors. 	1m	<p>Do not accept vague or incomplete explanations, e.g.</p> <ul style="list-style-type: none"> A square number doesn't have 2 factors (repeat of the question) $2^2 = 4$ (incomplete) Prime numbers have 2 factors only (incomplete) Prime numbers squared have more than 2 factors (vague) <p>Do not accept explanations which include incorrect mathematics or incorrect information relevant to the explanation, e.g.</p> <ul style="list-style-type: none"> $49 = 1, 7, 49$ 5 squared is 25 1, 5, 5, 25 25 has four factors All prime numbers squared have more than 3 factors

Qu.	Requirement	Mark	Additional guidance
20	<p>Award THREE marks for the correct answer of 207,300</p> <p>If the answer is incorrect, award TWO marks for:</p> <ul style="list-style-type: none"> evidence of an appropriate complete method which contains no more than one error, e.g. $\begin{array}{r} 24,863 \\ 170,932 \\ 282,420 \\ + 350,824 \\ \hline 828,939 \text{ (error)} \end{array}$ $828,939 \div 4 = 207,234 \text{ r}3$ <p>Rounded to the nearest hundred = 207,200</p> <p>OR</p> <ul style="list-style-type: none"> sight of 207,259 r3 OR $207,259 \frac{3}{4}$ OR 207,259.75 <p>Award ONE mark for:</p> <ul style="list-style-type: none"> evidence of an appropriate method with more than one error. 	Up to 3m	<p>Answer need not be obtained or rounded for the award of ONE 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>TWO marks will be awarded if an appropriate method with the misread number is followed through correctly.</p> <p>ONE mark will be awarded for evidence of an appropriate method with the misread number followed through correctly with no more than one error.</p>
21	<p>Award ONE mark for x and y coordinates written correctly:</p> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 10px;">(6 , 3)</div>	1m	