9. Mark schemes for Paper 3: reasoning

Qu.	Requirement	Mark	Additional guidance
1	£7,899	1m	Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
2a	7	1m	**Do not** accept 70,000 or 70 thousands.
2b	4,000,000	1m	Accept 4 million or four million **Do not** accept the answer 4
3	Award **ONE** mark for the correct box ticked, as shown: **Tick one.** $10 + a$ ☐ $10 \div a$ ☐ $a - 10$ ☐ $10 - a$ ☑ $a \times 10$ ☐	1m	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.
4	Masses in correct order, as shown: **0.009 kg** **0.99 kg** **1.025 kg** **1.25 kg** **lightest**	1m	All masses must be in the correct order for the award of **ONE** mark. Accept for **ONE** mark the masses written in reverse order **AND** the label lightest has been changed to follow suit. Misreads and transcription errors are **not** allowed.
5	Addition completed, as shown **1** 2 **8** + **7** 2 = 2 0 0	1m	All numbers must be correct for the award of the mark.

<table>
<tr><th>Qu.</th><th>Requirement</th><th>Mark</th><th>Additional guidance</th></tr>
<tr><td>6</td><td>Award TWO marks for the correct answer of £6.87

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.
• £1.49 + £1.64 = £3.13
£10 – £3.13 =
OR
• £10 – £1.49 = £8.51
£8.51 – £1.64 =
OR
• £10 – 164p – 149p =</td><td>Up to 2m</td><td>Answer need not be obtained for the award of ONE mark.

Accept for ONE mark an answer of £687 OR £687p as evidence of an appropriate method.

Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.</td></tr>
<tr><td>7a

7b</td><td>155

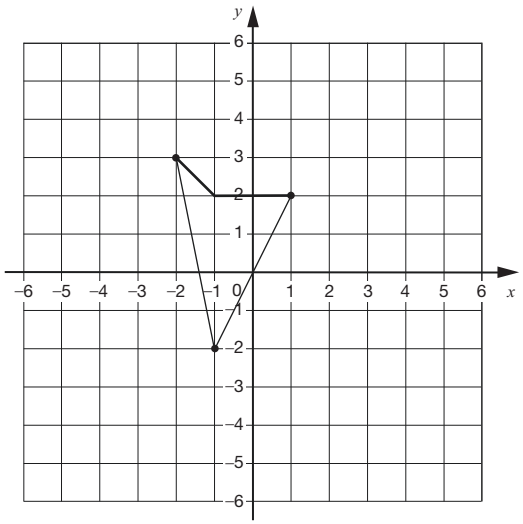
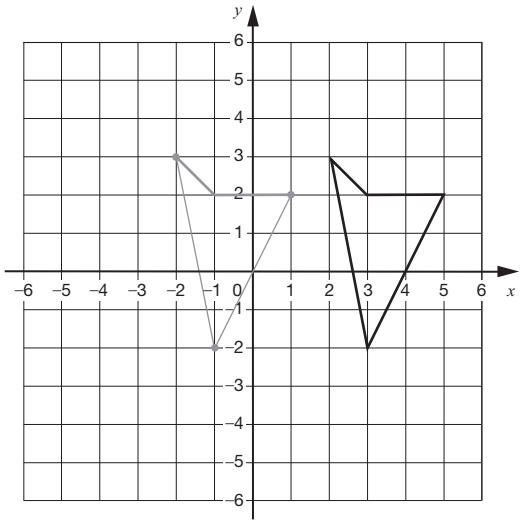
Table completed with three correct numbers, as shown:
<table><tr><th>Mass in g</th><th>Number of kittens</th></tr><tr><td>250–299</td><td>2</td></tr><tr><td>300–349</td><td>3</td></tr><tr><td>350–399</td><td>2</td></tr><tr><td>400–449</td><td>1</td></tr></table></td><td>1m

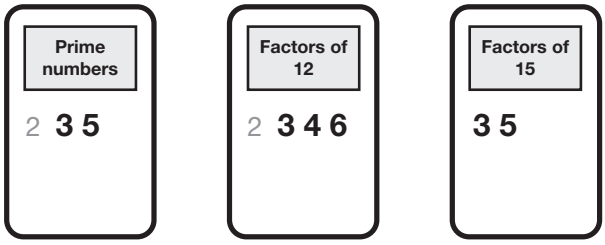
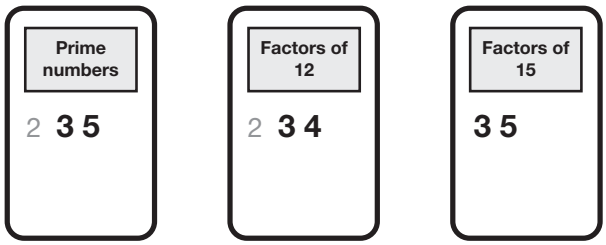
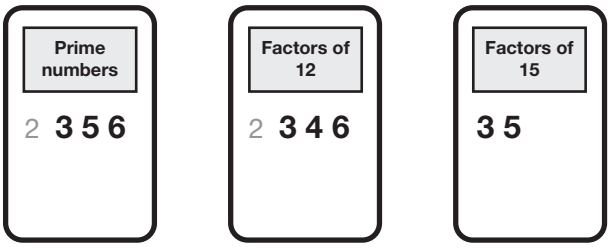
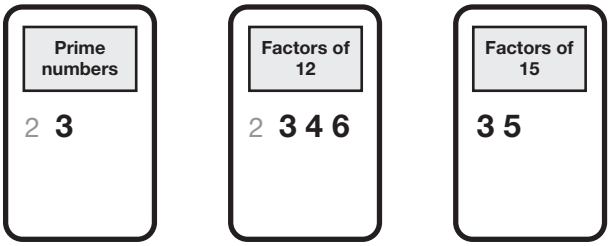
1m</td><td>All three numbers must be correct for the award of the mark.

Do not accept tally marks on their own.</td></tr>
<tr><td>8</td><td>Award TWO marks for the correct answer of 1,356

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.
• 4289 + 355 = 4644
6000 – 4644 =
OR
• 6000 – 4289 – 355 =

OR
• 6000 – 4289 = 1711
1711 – 355 =</td><td>Up to 2m</td><td>Answer need not be obtained for the award of ONE mark.</td></tr>
</table>

Qu.	Requirement	Mark	Additional guidance
9	2,250	1m	**Do not** accept $2000\frac{1}{4}$ **OR** $2\frac{1}{4}$ **OR** 2.25
10a	Quadrilateral completed, as shown: 	1m	Accept slight inaccuracies in drawing provided the intention is clear. (See page 13 for guidance.)
10b	Quadrilateral translated correctly, as shown: 	1m	Accept slight inaccuracies in drawing provided the intention is clear. (See page 13 for guidance.) Award **ONE** mark if the answer to (b) is a quadrilateral with sides drawn and is a correct translation of their answer to (a).

Qu.	Requirement	Mark	Additional guidance
11	Award **TWO** marks for all four given numbers placed completely correctly 7 times, as shown:  If the answer is incorrect, award **ONE** mark for three of the given numbers all placed completely correctly, e.g.  **OR**  **OR**  	**Up to 2m**	Accept the numbers in any order. Ignore any additional numbers not given in the question.

Qu.	Requirement	Mark	Additional guidance
12	Award **ONE** mark for two correct answers, as shown: length = **19 cm** width = **9.1 cm**	**1m**	Refer to section 6.3 on page 16 for additional guidance on marking answers involving measures.
13	An explanation that includes a correct counter example, e.g. • When you double 10° it is not obtuse • 2 × 27° = 54° • Double 45° is a right angle not obtuse **OR** An explanation that demonstrates where the statement in the question is not correct, e.g. • If the acute angle is less than 45° then doubling it will be less than 90°, so it won't be obtuse (more than 90°).	**1m**	**Do not** accept vague or incomplete explanations, e.g. • Sometimes it will be acute • Some acute angles are half an obtuse angle, but not all • When you double an acute angle, you get a right angle **Do not** accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation, e.g. • 20°C × 2 = 40°C • 20% x 2 = 40%
14	91	**1m**	
15	400	**1m**	

Qu.	Requirement	Mark	Additional guidance
16	Award **TWO** marks for the correct answer of £1.85 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • $1\frac{1}{2} \times$ £1.50 = £2.25 $\frac{1}{2}$ of £1.80 = 70p *(error)* £2.25 + 70p = £2.95 £5 – £2.95 = **OR** • £1.50 + 75 = £2.25 £2.25 + 90 = 415p *(error)* £5.00 – 415p = **OR** • sight of £3.15 **OR** 315p as evidence of evaluating the correct cost of the potatoes and carrots.	**Up to 2m**	**Do not** accept misreads for this question. Answer need not be obtained for the award of **ONE** mark. Accept for **ONE** mark an answer of £185 or £185p as evidence of an appropriate method. Refer to section 6.1 on pages 14 and 15 for additional guidance on marking answers involving money.
17	Award **ONE** mark for any pair of whole numbers less than 10 that satisfy the equation, i.e. $x = 8$ **AND** $y = 6$ **OR** $x = 6$ **AND** $y = 7$ **OR** $x = 4$ **AND** $y = 8$ **OR** $x = 2$ **AND** $y = 9$	**1m**	

Qu.	Requirement	Mark	Additional guidance
18	Award **TWO** marks for three boxes ticked correctly, as shown: $\frac{1}{2}$ ✓ $\frac{2}{8}$ ✓ $\frac{3}{4}$ ☐ $\frac{7}{16}$ ✓ $\frac{24}{32}$ ☐ Award **ONE** mark for: • only two boxes ticked correctly and no incorrect boxes ticked **OR** • three boxes ticked correctly and one incorrect box ticked.	**Up to 2m**	Accept alternative unambiguous positive indication of the correct answer, e.g. Y.

Qu.	Requirement	Mark	Additional guidance
19	Award **THREE** marks for the correct answer of 7,174 If the answer is incorrect, award **TWO** marks for: • evidence of an appropriate complete method which contains no more than one arithmetic error, e.g. $\begin{array}{r} 53 \\ \times\ 68 \\ \hline 3504 \end{array}$ *(error)* $\qquad$ $\begin{array}{r} 105 \\ \times\ 34 \\ \hline 3570 \end{array}$ 3,504 + 3,570 = 7,074 Award **ONE** mark for: • evidence of an appropriate method with more than one arithmetic error. **OR** • sight of 3,604 as evidence of long multiplication step (68 × 53) completed correctly. **OR** • sight of 3,570 as evidence of long multiplication step (105 × 34) completed correctly.	**Up to 3m**	Answer need not be obtained for the award of **ONE** mark. 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. **TWO** marks will be awarded if an appropriate method with the misread number is followed through correctly. **ONE** mark will be awarded for evidence of an appropriate method with the misread number followed through correctly with no more than one arithmetic error.

Qu.	Requirement	Mark	Additional guidance
20	Award **TWO** marks for the correct answer of 29 If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. • 2 × 500 = 1,000 1,000 ÷ 34 = **OR** • 2 × 500 ÷ 34 = **OR** • 500 ÷ 34 = 14 r23 *(error)* 14 r23 × 2 = 28 r46 **OR** • 34 × 10 = 340 34 × 30 = 1,020 Answer = 30 booklets *(error)*	**Up to 2m**	Answer need not be obtained for the award of **ONE** mark. Answer does not need to have been rounded or rounded correctly for the award of **ONE** mark. If a pupil reaches a non-integer answer, for example 28 r2 and expresses it as 28.2 without further working, this is considered a notation error and is condoned. Within an appropriate method, if the pupil's remainder from 500 divided by 34 is less than 17 and this remainder is ignored before doubling, this is acceptable for **ONE** mark. If the pupil's remainder is 17 or more and it has been ignored before doubling, this is **not** acceptable for **ONE** mark. **Do not** accept a trial and improvement method.
21a	Award **ONE** mark for **B** is (55, 30)	**1m**	
21b	Award **ONE** mark for **D** is (55, 14) If B and D are incorrect, **ONE** mark may be given for the correct y coordinate for both B and D and the same x coordinate (incorrect) for both points, i.e. • D is (same x as B, 14)	**1m**	
22	10.5 (cm)	**1m**	Accept $10\frac{1}{2}$

Qu.	Requirement	Mark	Additional guidance
23	An explanation that gives the correct values for PQ and/or QR, e.g. • PQ = 640m • QR is 160, 160 times 4 is not 600m • **OR** An explanation recognising PR is 800m and must be 5 times QR, e.g. • the total distance is 800m. Divide by 5 to give 160 for distance between Q and R, so P and Q is 4 × 160 = 640m (not 600m) • if QR is 200m, then PR is 1000m not 800m • if PQ is 600m then QR is 800 – 600 = 200m. Then PR is 5 × 200 = 1000m but it is only 800m. **OR** An explanation that PQ is not 600m, e.g. • if it was 600m then the shorter distance would be 200m if added to make 800m, 600m is 3 times 200, not 4 times • Olivia is not correct because 600 ÷ 4 = 150 and 600 + 150 doesn't equal 800 • Olivia is not correct because 800 – 600 = 200 and 600 is not 4 times 200	1m	**Do not** accept vague, incomplete or incorrect explanations, e.g. • Olivia is not correct because you can't divide 600 by 4 like you can for 800 **Do not** accept explanations which include incorrect mathematics or incorrect information that is relevant to the explanation.