

WA8MNAUN5

Understanding number

Core + Challenge

Proportional Reasoning with Ratios — Marking Key

I can find unknowns in equivalent ratios and fractions, share in a ratio and scale recipes and maps.

For tutors and parents. Award method marks for correct working even if the final answer is wrong.

Marks summary

Section A Fluency: 16 Section B Core: 22 Section C Reasoning: 9 Section D Challenge: 11 **Total: 58**

Fluency: 1 mark each; accept an equivalent unsimplified answer for half credit at tutor's discretion.

A

Fluency *answers and working*

/ 16 marks

Q	Answer	Working
1	12	$5 \times 4 = 20$, so $3 \times 4 = 12$
2	35	$4 \times 5 = 20$, so $7 \times 5 = 35$
3	3 : 4	$\div 6$
4	9	$4 \times 3 = 12$, so $3 \times 3 = 9$
5	32	$5 \times 4 = 20$, so $8 \times 4 = 32$
6	5 : 3	$\times 2$ gives 5 : 3
7	\$15 and \$25	8 parts; 1 part = \$5
8	16 and 56	9 parts; 1 part = 8
9	10, 20, 30	6 parts; 1 part = 10
10	\$17.50	1 kg = \$2.50; $\times 7$
11	\$45	1 pie = \$4.50; $\times 10$
12	1 km	$4 \times 25\,000 = 100\,000\text{ cm} = 1000\text{ m}$
13	40	$\times 5$
14	14	$9 \times 7 = 63$, so $2 \times 7 = 14$
15	25	$\times 5$
16	14	$3 \times 2 = 6$, so $7 \times 2 = 14$

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B

Core answers, working and marks

/ 22 marks

Q	Answer	Working / sample response	Marks
1	A = 140, B = 18, C = 175	$40 = 2 \times 20$, so $A = 7 \times 20 = 140$ $63 = 7 \times 9$, so $B = 2 \times 9 = 18$ $50 = 2 \times 25$, so $C = 7 \times 25 = 175$ 1 mark each	3
2	3.75 cups, 750 mL, 5 eggs, 150 g	Multiplier $\frac{10}{4} = 2.5$ $1.5 \times 2.5 = 3.75$ cups; $300 \times 2.5 = 750$ mL; $2 \times 2.5 = 5$ eggs; $60 \times 2.5 = 150$ g 1 mark: multiplier 2.5 1 mark: all four amounts correct	2
3	Ava \$36, Ben \$48	7 parts; 1 part = $84 \div 7 = \$12$ $3 \times 12 = 36$; $4 \times 12 = 48$ 1 mark: one part = \$12 1 mark: both amounts	2
4	(a) 1.5 km (b) 12 cm	(a) $7.5 \times 20\,000 = 150\,000$ cm = 1500 m = 1.5 km (b) 2.4 km = 240 000 cm; $240\,000 \div 20\,000 = 12$ cm 1 mark each	2
5	375 km	$90 \div 7.2 = 12.5$ km per litre $12.5 \times 30 = 375$ km 1 mark: 12.5 km/L (or equivalent) 1 mark: 375 km	2
6	48 L	White has 2 more parts than blue: 2 parts = 12 L, so 1 part = 6 L Total 8 parts = 48 L 1 mark: 1 part = 6 L 1 mark: 48 L	2
7	6 more	8 parts; 1 part = 3 games Won 15, lost 9; $15 - 9 = 6$ 1 mark: 15 and 9 1 mark: 6	2
8	4.68 m	$26 \times 18 = 468$ cm 468 cm = 4.68 m 1 mark: 468 cm 1 mark: 4.68 m	2
9	640 students	$\frac{1}{8}$ of the students = $240 \div 3 = 80$ $\frac{8}{8} = 80 \times 8 = 640$ 1 mark: 80 1 mark: 640	2
10	Cement 0.2 m^3 , sand 0.4 m^3 , gravel 0.8 m^3	$1 + 2 + 4 = 7$ parts; 1 part = $1.4 \div 7 = 0.2 \text{ m}^3$ Sand $2 \times 0.2 = 0.4$; gravel $4 \times 0.2 = 0.8$ 1 mark: 7 parts 1 mark: one part 0.2 1 mark: all three amounts	3

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C Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	Adding does not keep the ratio	Equivalent ratios come from multiplying or dividing both parts by the same number, not adding. 2 : 3 means the first part is $\frac{2}{3}$ of the second, but in 4 : 5 it is $\frac{4}{5}$, and $\frac{2}{3} \neq \frac{4}{5}$. <i>1 mark: multiply/divide, not add</i> <i>1 mark: shows they are different (e.g. $\frac{2}{3} \neq \frac{4}{5}$)</i>	2
2	B is stronger	Fraction of the drink that is cordial: $A = \frac{3}{13} \approx 0.231$, $B = \frac{4}{17} \approx 0.235$ (or cordial per mL of water: $A \approx 0.3$, $B \approx 0.308$) B has a larger fraction of cordial, so B is stronger. <i>1 mark: a valid comparison method</i> <i>1 mark: correct values</i> <i>1 mark: B</i>	3
3	False	The total is $3 + 4 = 7$ parts, so a is $\frac{3}{7}$ of the total. a is $\frac{3}{4}$ of b, not $\frac{3}{4}$ of the total. <i>1 mark: false</i> <i>1 mark: $\frac{3}{7}$ of the total</i>	2
4	2 cm → 100 000 cm = 1 km	$2 \times 50\,000 = 100\,000$ cm $100\,000$ cm = 1000 m = 1 km <i>1 mark: 100 000 cm</i> <i>1 mark: converts to 1 km</i>	2

D Challenge *solutions and marking criteria*

/ 11 marks

Q	Answer	Working / sample response	Marks
1	40 girls	Let boys = 3k, girls = 5k. $(3k + 6) : 5k = 3 : 4$ $4(3k + 6) = 3 \times 5k \rightarrow 12k + 24 = 15k \rightarrow k = 8$ Girls = $5 \times 8 = 40$ (check: $30 : 40 = 3 : 4$) <i>1 mark: sets up the new ratio</i> <i>1 mark: $k = 8$</i> <i>1 mark: 40</i>	3
2	(a) 8 : 12 : 15 (b) c = 75	Make b the same: $a : b = 8 : 12$ and $b : c = 12 : 15$, so $a : b : c = 8 : 12 : 15$ 35 parts; 1 part = $175 \div 35 = 5$ $c = 15 \times 5 = 75$ <i>1 mark: 8 : 12 : 15</i> <i>1 mark: 1 part = 5</i> <i>1 mark: 75</i>	3

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Q	Answer	Working / sample response	Marks
3	Mia \$100, Tom \$60	$5k - 20 = 3k + 20$ $2k = 40 \rightarrow k = 20$ Mia $5 \times 20 = \$100$, Tom $3 \times 20 = \$60$ (check: both \$80) <i>1 mark: equation or reasoning with parts</i> <i>1 mark: $k = 20$</i> <i>1 mark: both amounts</i>	3
4	1.08 ha	$6 \text{ cm} \rightarrow 12\,000 \text{ cm} = 120 \text{ m}$; $4.5 \text{ cm} \rightarrow 9000 \text{ cm} = 90 \text{ m}$ $120 \times 90 = 10\,800 \text{ m}^2 = 1.08 \text{ ha}$ <i>1 mark: 120 m and 90 m</i> <i>1 mark: 1.08 ha</i>	2