

WA7MNA07

Calculating with number

Core + Challenge

Estimating to Check Reasonableness — Marking Key

I can use rounding, estimation and the context to check whether an answer is reasonable.

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: 10 **Total: 57**

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	25	$6.5 + 18.5 = 25$ (accept any sensible estimate)
2	30	$5 \times 6 = 30$ (accept any sensible estimate)
3	1400	$700 \div 0.5 = 1400$ (accept any sensible estimate)
4	\$25	5% of 500 = \$25 (accept any sensible estimate)
5	90	$39 + 51 = 90$ (accept any sensible estimate)
6	20	$800 \div 40 = 20$ (accept any sensible estimate)
7	100	$0.5 \times 200 = 100$ (accept any sensible estimate)
8	100	$20 \times 5 = 100$ (accept any sensible estimate)
9	16	$4 \times 4 = 16$ (accept any sensible estimate)
10	20	$60 \div 3 = 20$ (accept any sensible estimate)
11	20	25% of 80 = 20 (accept any sensible estimate)
12	4	$7 - 3 = 4$ (accept any sensible estimate)
13	50	$200 \times 0.25 = 50$ (accept any sensible estimate)
14	4	$2 + 2 = 4$ (accept any sensible estimate)
15	0.5	$1 \times 0.5 = 0.5$ (accept any sensible estimate)
16	50	$400 \div 8 = 50$ (accept any sensible estimate)

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B

Core *answers, working and marks*

/ 22 marks

Q	Answer	Working / sample response	Marks
1	≈ 200; 189.54	$48.6 \times 3.9 \approx 50 \times 4 = 200$, so 18.954 is 10 times too small. Correct: 189.54 <i>1 mark: estimate</i> <i>1 mark: 189.54</i>	2
2	≈ \$28; \$27.89	$5 + 12 + 8 + 3 = 28$; exact 27.89 <i>1 mark: estimate</i> <i>1 mark: \$27.89</i>	2
3	1300	$\approx 700 \div 0.5 = 1400$; dividing by about a half doubles the number. (Exact ≈ 1318.8) <i>1 mark: 1300</i> <i>1 mark: reasoning</i>	2
4	No – ≈ \$1500; \$1589.25	$30 \times 50 = 1500$ $32.5 \times 48.90 = 1589.25$ (the quote is 10 times too big) <i>1 mark: estimate</i> <i>1 mark: not reasonable</i> <i>1 mark: \$1589.25</i>	3
5	≈ 32 L; 32.136 L	$\approx 8 \times 4 = 32$; $7.8 \times 4.12 = 32.136$ <i>1 mark: estimate</i> <i>1 mark: exact</i>	2
6	No – 32	Multiplying by 0.5 halves the number, so the answer must be less than 64: 32. <i>1 mark: no</i> <i>1 mark: reason and 32</i>	2
7	54 kg to 72 kg	$60 \times 0.15 \times 6 = 54$; $80 \times 0.15 \times 6 = 72$ <i>1 mark: low value</i> <i>1 mark: high value</i> <i>1 mark: states a range / assumption</i>	3
8	≈ \$25; \$24.75	$5\% \text{ of } 500 = 25$; $0.0495 \times 500 = 24.75$ <i>1 mark each</i>	2
9	Reasonable (≈ 600 m ²)	$20 \times 30 = 600$, close to 614.64 <i>1 mark: estimate</i> <i>1 mark: conclusion</i>	2
10	20	$\approx 10 \div 0.5 = 20$ <i>1 mark: 20</i> <i>1 mark: reasoning</i>	2

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C

Reasoning *sample answers and marking criteria*

/ 9 marks

Q	Answer	Working / sample response	Marks
1	e.g. $6 \div 0.5 = 12$	Dividing asks how many parts fit; small parts fit many times: 12 halves in 6. <i>1 mark: explanation</i> <i>1 mark: example</i>	2
2	Catches keying/place-value errors	e.g. typing 4.86 instead of 48.6 gives an answer 10 times too small; an estimate shows this straight away. <i>1 mark each point</i>	2
3	Ana's	Exact ≈ 24.98 . Ana: $6 + 19 = 25$ (0.02 away). Ben: $6 + 18 = 24$ (almost 1 away). Ignoring the fractions always underestimates; rounding to the nearest whole balances up and down. <i>1 mark: exact ≈ 25</i> <i>1 mark: Ana</i> <i>1 mark: explanation</i>	3
4	Yes	Each factor is bigger than the real one, so the product is bigger (for positive numbers). <i>1 mark: yes</i> <i>1 mark: reason</i>	2

D

Challenge *solutions and marking criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	$48 \div 0.9$	0.9×48 and $48 \div 1.1$ are below 48. $48 \times 1.1 = 52.8$. $48 \div 0.9 = 53\frac{1}{3}$, since dividing by 0.9 adds $\frac{1}{9}$ (more than $\frac{1}{10}$). <i>1 mark: rules out two below 48</i> <i>1 mark: compares the other two</i> <i>1 mark: answer</i>	3
2	(a) 200.72 (b) 0.20072	(a) $\approx 40 \times 5 = 200$ (b) $\approx 4 \times 0.05 = 0.2$ <i>1 mark each</i>	2
3	(a) ≈ 28 (exactly 28.2) (b) 6 boxes	$94 \times 0.3 = 28.2$, so 29 pizzas are needed $29 \div 5 = 5.8 \rightarrow 6$ boxes (30 pizzas) <i>1 mark: 28.2 / 29</i> <i>1 mark: divides by 5</i> <i>1 mark: rounds up to 6</i>	3
4	No – 26.10	1.05 is just over 1, so the answer should be just under 27.4. $27.4 \div 1.05 = 26.10$ <i>1 mark: not reasonable</i> <i>1 mark: 26.10</i>	2