

WA6MNACN6

Calculating with number

Core + Challenge

Estimating and Rounding — Marking Key

I can round numbers and decimals, estimate before I calculate, and judge if an answer is reasonable.

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

Marks summary

A Warm up: 16 B Practise: 21 C Think it through: 10 D Challenge: 9 **Total: 56**

Gold shading in this key shows what the child should have shaded or drawn. Accept any correct arrangement unless the question fixes it.

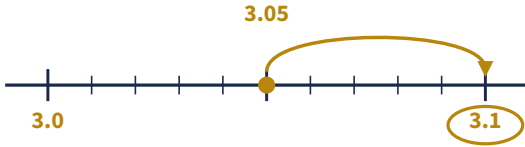
A

Warm up answers

/ 16 marks

Q	Answer	Model answer / notes	Marks
1	70	 67 is between 60 and 70. It is past the halfway mark 65, so it rounds to 70.	1
2	300	342 is between 300 and 400. It is before the halfway mark 350, so it rounds to 300.	1
3	7,000	6,500 is exactly halfway between 6,000 and 7,000, so it rounds up to 7,000.	1
4	5	4.7 is between 4 and 5. It is past the halfway mark 4.5, so it rounds to 5.	1
5	8.6	 8.63 is between 8.6 and 8.7. It is before the halfway mark 8.65, so it rounds to 8.6.	1
6	2,400	2,449 is between 2,400 and 2,500. It is before the halfway mark 2,450, so it rounds to 2,400.	1
7	80	83 is between 80 and 90. It is before the halfway mark 85, so it rounds to 80.	1
8	1,800	1,750 is exactly halfway between 1,700 and 1,800, so it rounds up to 1,800.	1

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Q	Answer	Model answer / notes	Marks
9	15,000	 15,280 is between 15,000 and 16,000. It is before the halfway mark 15,500, so it rounds to 15,000.	1
10	10	9.52 is between 9 and 10. It is past the halfway mark 9.5, so it rounds to 10.	1
11	3.1	 3.05 is exactly halfway between 3.0 and 3.1, so it rounds up to 3.1.	1
12	1,000	996 is between 990 and 1,000. It is past the halfway mark 995, so it rounds to 1,000.	1
13	1,000	100 1,000 10,000 $50 \times 20 = 1,000$.	1
14	900	$600 + 300 = 900$.	1
15	500	$4,000 \div 8 = 500$.	1
16	48	$8 \times 6 = 48$.	1

B

Practise *answers and working*

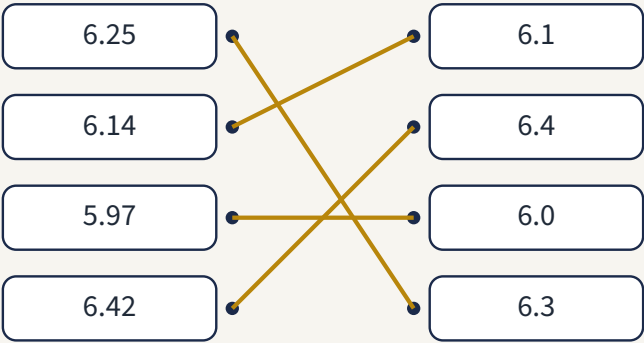
/ 21 marks

Q	Answer	Working / sample response	Marks																
1	See table	<table border="1"> <thead> <tr> <th>Number</th><th>Nearest 10</th><th>Nearest 100</th><th>Nearest 1,000</th></tr> </thead> <tbody> <tr> <td>6,437</td><td>6,440</td><td>6,400</td><td>6,000</td></tr> <tr> <td>17,351</td><td>17,350</td><td>17,400</td><td>17,000</td></tr> <tr> <td>995</td><td>1,000</td><td>1,000</td><td>1,000</td></tr> </tbody> </table> 6,437: 6,440, 6,400, 6,000. 17,351: 17,350, 17,400, 17,000. 995: 1,000, 1,000, 1,000. 995 is exactly halfway between 990 and 1,000, so it rounds up to 1,000. It is also 1,000 to the nearest 100 and 1,000. <i>1 mark for each fully correct row.</i>	Number	Nearest 10	Nearest 100	Nearest 1,000	6,437	6,440	6,400	6,000	17,351	17,350	17,400	17,000	995	1,000	1,000	1,000	3
Number	Nearest 10	Nearest 100	Nearest 1,000																
6,437	6,440	6,400	6,000																
17,351	17,350	17,400	17,000																
995	1,000	1,000	1,000																

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Q	Answer	Working / sample response	Marks												
2	About 900; exact 898	Estimate: $400 + 500 = 900$. Exact: $386 + 512 = 898$, which is close to 900. <i>1 mark: 900.</i> <i>1 mark: 898.</i>	2												
3	31, 29, 35; 31.5, 29.0, 35.0	<table border="1"><thead><tr><th>Temperature</th><th>Nearest whole</th><th>Nearest tenth</th></tr></thead><tbody><tr><td>31.47°C</td><td>31°C</td><td>31.5°C</td></tr><tr><td>28.95°C</td><td>29°C</td><td>29.0°C</td></tr><tr><td>35.04°C</td><td>35°C</td><td>35.0°C</td></tr></tbody></table> 31.47: 31 (4 tenths) and 31.5 (7 hundredths rounds up). 28.95: 29 (9 tenths) and 29.0 (halfway rounds up: $28.9 \rightarrow 29.0$). 35.04: 35 and 35.0 (4 hundredths rounds down). <i>1 mark: all three whole numbers.</i> <i>1 mark: all three tenths (accept 29 and 35 for 29.0 and 35.0).</i>	Temperature	Nearest whole	Nearest tenth	31.47°C	31°C	31.5°C	28.95°C	29°C	29.0°C	35.04°C	35°C	35.0°C	2
Temperature	Nearest whole	Nearest tenth													
31.47°C	31°C	31.5°C													
28.95°C	29°C	29.0°C													
35.04°C	35°C	35.0°C													
4	Estimate 2,500; correct 2,496	$48 \approx 50$ and $52 \approx 50$, so $48 \times 52 \approx 50 \times 50 = 2,500$. 24,960 is about ten times too big. The exact answer is 2,496. <i>1 mark: estimate of 2,500 used to show 24,960 is too big.</i> <i>1 mark: 2,496.</i>	2												
5	550 and 649	 Numbers from 550 up to (but not including) 650 round to 600: filled dot at 550, open dot at 650. The smallest whole number is 550 (halfway rounds up). The largest is 649 (650 rounds to 700). <i>1 mark: 550.</i> <i>1 mark: 649.</i>	2												
6	About \$18; more (exact \$17.50)	$\$5 + \$2 + \$7 + \$4 = \$18$. Exact: $\$4.85 + \$2.15 + \$6.90 + \$3.60 = \$17.50$. The estimate is more: three prices were rounded up by 15c, 10c and 40c, and only one was rounded down by 15c. <i>1 mark: rounded prices \$5, \$2, \$7, \$4.</i> <i>1 mark: \$18.</i> <i>1 mark: more, with a reason (or the exact \$17.50).</i>	3												
7	About \$50 a week	$\$1,960 \approx \$2,000$ and $38 \approx 40$. $2,000 \div 40 = 50$, so about \$50 a week. <i>1 mark: sensible rounding (2,000 and 40).</i> <i>1 mark: about \$50.</i>	2												

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Q	Answer	Working / sample response	Marks
8	a) 1,000 and 10,000 b) 57,500 c) 57,500	a) 57,000 is to the nearest thousand. 60,000 is to the nearest ten thousand. b) 57,486 is past 57,450, so it rounds to 57,500. c) 57,500 is only 14 away. 57,000 is 486 away and 60,000 is 2,514 away. <i>1 mark for each part.</i>	3
9	See lines	 6.25 → 6.3 6.14 → 6.1 5.97 → 6.0 6.42 → 6.4 <i>2 marks: all four correct. 1 mark: two or three correct.</i>	2

C

Think it through *sample answers and criteria*

/ 10 marks

Q	Answer	Working / sample response	Marks
1	No, it is 3,000	You must round the original number in one step. 3,449 is between 3,000 and 4,000 and is before the halfway mark 3,500. So 3,449 rounds to 3,000. Rounding again and again made it creep up. <i>1 mark: No, 3,000.</i> <i>1 mark: explains that 3,449 is less than 3,500 (round once, from the original number).</i>	2
2	False	4,700 rounds to 5,000 to the nearest thousand. But to the nearest hundred 4,700 stays 4,700. So the statement is false. <i>1 mark: False.</i> <i>1 mark: a correct counter-example.</i>	2
3	Always	Always Sometimes Never Each rounded number is bigger than the real number. Adding two bigger numbers always gives a bigger total, e.g. $38 + 47 \approx 40 + 50 = 90$, more than 85. <i>1 mark: Always.</i> <i>1 mark: explanation or example.</i>	2

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Q	Answer	Working / sample response	Marks
4	8.55	8.46, 8.54 and 8.45 all round to 8.5 (8.45 is halfway, so it rounds up). 8.55 is halfway between 8.5 and 8.6, so it rounds up to 8.6. <i>1 mark: 8.55.</i> <i>1 mark: shows the others round to 8.5.</i>	2
5	Yes, enough	Round \$3.95 up to \$4: $23 \times \$4 = \$92$. Rounding up gives more than the real cost, so the real cost is less than \$92. \$100 is enough. (Exact: \$90.85.) <i>1 mark: Yes, with $23 \times \\$4 = \\$92$ (or similar).</i> <i>1 mark: explains that rounding up makes the estimate bigger than the real cost, so it is a safe check.</i>	2

D

Challenge solutions and criteria

/ 9 marks

Q	Answer	Working / sample response	Marks
1	445, 446, 447, 448, 449	Numbers that round to 450 (nearest 10) are 445 to 454. Numbers that round to 400 (nearest 100) are 350 to 449. Both are true for 445, 446, 447, 448 and 449. (450 rounds to 500.) <i>1 mark: 445 to 454 (or the 450 condition used).</i> <i>1 mark: 350 to 449 (or the 400 condition used).</i> <i>1 mark: all five numbers and no others.</i>	3
2	5,729, 5,792, 5,927, 5,972	The number must be from 5,500 to 6,499. No digit 6, so it must start with 5, and the next digit must be 5 or more: 7 or 9. 5,729, 5,792, 5,927, 5,972. <i>2 marks: all four numbers (1 mark for two or three).</i> <i>1 mark: explains why it must start 57 or 59.</i>	3
3	a) About \$12,000 b) More c) Yes	a) $60 \times \$200 = \$12,000$. b) Both numbers were rounded up, so the estimate is more than the exact cost. c) The exact cost is less than \$12,000, so it is enough. (Exact: $58 \times 196 = \$11,368$.) <i>1 mark for each part (c needs a reason).</i>	3