



Rounding decimals

GRADE 5 MATH

Answer keys for the exit ticket and practice worksheet, plus notes for the lesson slides. Each answer shows the steps and the most likely wrong answer (“If wrong”), so you can tell what a mistake means, not just that it is one. Questions go from **fluency** to **application** to **reasoning**.

Exit Ticket — answer key

Use: End of the rounding-decimals lesson. Item 3 is the diagnostic and it is deliberately generous — it TELLS the child both of Kai's steps are correct, so there is nothing to find and the whole task is explaining why a method built from correct steps fails. The answer to look for is that whether 3.548 is nearer 3.5 or 3.6 turns only on the midpoint 3.55, so the thousandths digit has no say; staging gives it one. The sharpest version a child can offer is that 3.541 and 3.548 must round to the same tenth and on Kai's method they do not. Item 2 sets the trap for the same error by printing the three parts together — a child who takes the tenth from their own hundredth answer has staged it without noticing. This continues the “Rounding multi-digit numbers” sheet (Grade 4) exactly, and the neighbours-and-midpoint method is unchanged from it, so remind rather than reteach.

Timing: 5–8 min · independent · number lines available.

1. Two roundings with candidates **APPLICATION**

Answer: **0.7 and 6.28**

1. 0.749 is between 0.7 and 0.8; the midpoint is 0.75; 0.749 is below it, so 0.7.
2. 6.284 is between 6.28 and 6.29; the midpoint is 6.285; 6.284 is below it, so 6.28.
3. In both, the number is only just below the midpoint, which is exactly when staging would change the answer.

If wrong: Answered 0.8 and 6.29 — both rounded in stages (0.749 to 0.75 to 0.8; 6.284 to 6.29 by looking at the 4 after rounding the thousandths). Writing the candidates and midpoint down first is what makes this impossible.

2. 3.548 to three places FLUENCY

Answer: **4, 3.5 and 3.55**

1. Nearest whole: between 3 and 4, midpoint 3.5, and 3.548 is past it — so 4.
2. Nearest tenth: between 3.5 and 3.6, midpoint 3.55, and 3.548 is below — so 3.5.
3. Nearest hundredth: between 3.54 and 3.55, midpoint 3.545, and 3.548 is past — so 3.55.
4. Three different answers from one number, and each was rounded from the original 3.548.

If wrong: Answered 4, 3.6, 3.55 — the tenth arrived at from the 3.55 in the third answer. The three parts are deliberately printed together, and using one answer to produce another is precisely the error.

3. Kai's staged method REASONING

Answer: **because rounding to the nearest tenth is one decision about 3.548, and staging lets the thousandths digit change the hundredths first — so a digit that has no vote gets one**

1. 3.548 is between 3.5 and 3.6, and the midpoint is 3.55. 3.548 is below the midpoint, so the answer is 3.5.
2. Kai's first step is right: 3.548 to the nearest hundredth really is 3.55.
3. His second step is right too: 3.55 to the nearest tenth really is 3.6.
4. The METHOD is what fails. Whether 3.548 is nearer 3.5 or 3.6 depends only on whether it is past 3.55, and it is not. The 8 in the thousandths pushed the 4 up to a 5, and then that 5 decided the answer — so a digit too small to matter changed the outcome.
5. 3.541 and 3.548 must round to the same tenth, and on Kai's method they do not.

If wrong: Said Kai “rounded twice, and you should only round once”. That is the rule and not the reason; what makes it stick is seeing that staging hands a decision to a digit which the question does not consult, and the 3.541 comparison is the cleanest way to show it.

4. 0.96 to the nearest tenth REASONING

Answer: **1.0 — and written as 1 it no longer shows that the answer is a number of tenths**

1. 0.96 is between 0.9 and 1.0; the midpoint is 0.95; 0.96 is past it, so 1.0.
2. 1.0 and 1 are the same amount, so the value is not wrong.
3. But the question asked for the nearest TENTH, and 1.0 says ten tenths — the 0 records which place the answer was rounded to.
4. Written as 1, the answer could have come from rounding to the nearest whole, or hundredth, or anything else. The place is part of what was asked.

If wrong: Answered 1.0 and explained that “you need the 0 to show the decimal”. Close, and the reason is more specific: the 0 records the PLACE the rounding was to, which is information the bare 1 has thrown away.

Quick answers for fast checking:

#	Level	Answer
1	application	0.7 and 6.28, with midpoints 0.75 and 6.285
2	fluency	4, 3.5, 3.55
3	reasoning	staging gives the thousandths a vote it does not have
4	reasoning	1.0; the 0 records the place rounded to

Practice Worksheet — answer key

Use: In-class practice after the deck. Item 4 is the cheapest way to expose staging: 0.749 and 0.741 are on the same side of 0.75, so they MUST round to the same tenth, and a staged method gives them different answers. A child who reports different answers and is untroubled by it has not understood what rounding is deciding. Item 5 is its complement and the more interesting item — here staging happens to agree, and the answer wanted is that one agreeing case does not test a method, which is the same evidence argument as the “Relating two number patterns” sheet (Grade 5) and the “Reading and comparing decimals” sheet (Grade 5) item 5. Item 6 is the honest one: 8.5 is NOT nearer 9, and children who have been told it is have been told something they can check and disprove. Item 9 is the thread's own question, shared with the “Rounding multi-digit numbers” sheet (Grade 4) — the shortcut is not wrong, it is uncheckable, and it does not say which number to start from.

Timing: 15–20 min · pairs · number lines · items 4, 6 and 9 on the board.

1. Three to the nearest tenth **FLUENCY**

Answer: **2.5, 0.8 and 5.1**

1. 2.47 is between 2.4 and 2.5, midpoint 2.45, past it — 2.5.
2. 0.83 is between 0.8 and 0.9, midpoint 0.85, below it — 0.8.
3. 5.05 is between 5.0 and 5.1, midpoint 5.05, exactly on it — up by agreement, 5.1.

If wrong: Answered 2.5, 0.9, 5.1 — the 0.83 rounded up, most often by looking at the 3 and treating any following digit as a reason to move. 0.83 is below 0.85, so it stays at 0.8.

2. Three to the nearest hundredth **FLUENCY**

Answer: **0.42, 3.80 and 12.01**

1. 0.416 is between 0.41 and 0.42, midpoint 0.415, past it — 0.42.
2. 3.798 is between 3.79 and 3.80, midpoint 3.795, past it — 3.80.
3. 12.005 is between 12.00 and 12.01, exactly on the midpoint — up by agreement, 12.01.

If wrong: Wrote 3.8 for the second, dropping the hundredths place. The value is right and the question asked for hundredths, so 3.80 is the answer that says what was done.

3. Three to the nearest whole **FLUENCY**

Answer: **9, 0 and 20**

1. 8.5 is exactly halfway between 8 and 9 — up by agreement, 9.
2. 0.49 is between 0 and 1, midpoint 0.5, below it — 0.
3. 19.62 is between 19 and 20, midpoint 19.5, past it — 20.

If wrong: Answered 1 for 0.49, rounding up because the digits after the point “look big”. 0.49 is less than a half, so it rounds to 0 — and 0 is a legitimate answer to a rounding question.

4. 0.749 and 0.741 REASONING

Answer: **both 0.7 — and yes, they must be the same, because both are below the midpoint 0.75**

1. 0.749 is between 0.7 and 0.8, and below the midpoint 0.75, so 0.7.
2. 0.741 is also below 0.75, so 0.7 as well.
3. They must agree: the only thing that decides the answer is which side of 0.75 the number falls, and both fall on the same side.
4. This is why staging is wrong — on the staged method 0.749 becomes 0.8 and 0.741 stays 0.7, so two numbers on the same side of the midpoint get different answers.

If wrong: Answered 0.8 and 0.7 and said the difference was fine because “9 is bigger than 1”. That the two disagree IS the evidence the method is wrong, since neither number reaches the midpoint.

5. 4.297 by two routes REASONING

Answer: **4.3 both ways — the routes happen to agree here, which does not make staging safe**

1. Directly: 4.297 is between 4.2 and 4.3, midpoint 4.25, past it — 4.3.
2. In stages: 4.297 to the nearest hundredth is 4.30, and 4.30 to the nearest tenth is 4.3.
3. So both give 4.3 this time.
4. They agree because 4.297 is already well past the midpoint, so nothing the staging did could change the side it was on. When a number sits just BELOW a midpoint — like 3.548 or 0.749 — staging pushes it over and the routes disagree.

If wrong: Concluded that staging is fine because it worked here. One agreeing case does not test a method — the same argument as the “Relating two number patterns” sheet (Grade 5)’s, and the deciding cases are the ones just below a midpoint.

6. Is 8.5 nearer 9? REASONING

Answer: **no — it is exactly as far from 8 as from 9; it rounds to 9 because we have agreed to round halves up**

1. $8.5 - 8 = 0.5$, and $9 - 8.5 = 0.5$. The two distances are equal.
2. So “nearest” does not answer the question at all here.
3. Rounding halves up is a rule people agreed on, so that everyone gets the same answer.
4. It could have been agreed the other way, and in some fields it is — which is a sign that it is a convention rather than a fact.

If wrong: Said “yes, because 5 rounds up”. The rule is right and the reason it gives is false: 8.5 is not nearer 9. Telling a child otherwise is teaching something untrue, and they can check it.

7. The shelf APPLICATION

Answer: **2.0 m**

1. 1.96 is between 1.9 and 2.0; the midpoint is 1.95; 1.96 is past it.
2. So 2.0 m to the nearest tenth of a metre.
3. Written 2.0, not 2, because the question asked for tenths — 2.0 m says twenty tenths of a metre.

If wrong: Wrote 2 m. The measurement is right and the form has lost the precision that was asked for; in a real measurement 2.0 m and 2 m claim different things about how carefully it was measured.

8. A number rounding two ways APPLICATION

Answer: **for example 0.557 — it rounds to 0.6 to the nearest tenth and 0.56 to the nearest hundredth**

1. To round to 0.6 to the nearest tenth, the number must be at least 0.55.
2. To round to 0.56 to the nearest hundredth, it must be between 0.555 and 0.565.
3. Both conditions hold for anything from 0.555 to 0.565, so 0.557 works.
4. Note the two answers do not look consistent — 0.56 would round to 0.6 anyway here, but the point is that each rounding was done from the original number.

If wrong: Said it is impossible because “0.6 and 0.56 do not match”. They do not have to: rounding to different places gives different answers, and both are correct answers to different questions.

9. Why the shortcut is not enough REASONING

Answer: **because it does not say WHICH number to look at, so nothing in it stops you applying it twice — and it gives no way to check the answer**

1. The shortcut tells you what to do with a digit and not which number to start from, so rounding 3.55 after rounding 3.548 obeys it perfectly.
2. It also gives no picture: a child using it cannot say what 3.5 and 3.6 have to do with the question.
3. The two-candidates version answers both — it names 3.5 and 3.6 at the start, so there is only one decision available to make.
4. And it can be checked. A child can see that 3.548 is below 3.55; nothing about “the 4 is less than 5” can be checked against anything.

If wrong: Said “because it is wrong”. It is not wrong — applied once to the original number it always gives the right answer, which is exactly why it is dangerous. What it lacks is any statement of what it is a shortcut FOR, so it cannot be checked and cannot stop itself being used twice.

Quick answers for fast checking:

#	Level	Answer
1	fluency	2.5, 0.8, 5.1
2	fluency	0.42, 3.80, 12.01
3	fluency	9, 0, 20
4	reasoning	both 0.7; they must agree
5	reasoning	4.3 both ways; agreement here proves nothing
6	reasoning	no — equidistant; up by agreement
7	application	2.0 m
8	application	0.557
9	reasoning	it never says which number to start from, and cannot be checked

Lesson slides — teaching notes & timing

Mini-lesson slides, then the practice worksheet. Slide numbers match the deck.

Slide	~Time	Note
1/8	0:00	This continues the “Rounding multi-digit numbers” sheet (Grade 4) rather than starting fresh — the neighbours-and-midpoint method is the same, and children who met it in Grade 4 should be reminded rather than retaught. The new content is what happens when the shortcut is applied more than once.
2/8	0:40	Write the two questions on the board and keep them there all lesson. Every item on both sheets can be answered by them, and a child who writes the two candidates down cannot make the staging error.
3/8	1:20	Work 3.548 with the method. The midpoint 3.55 is the only number that has to be worked out, and comparing against it is one decision.
4/8	2:15	THE slide. Present the staged method sympathetically and check both steps aloud — they really are both right. The class should be uneasy rather than corrected: two correct steps, and a different answer.
5/8	3:15	The explanation, and it is worth being precise: rounding to the nearest tenth is a question about which tenth, so the thousandths digit has no vote. Staging gives it one by letting it change the hundredths first. Say “always go back to the original number” and have them write it down.
6/8	4:15	The 1.0 case. Ask what is lost by writing 1: the answer to “how many tenths” should be readable as tenths, and 1.0 says ten of them.
7/8	5:15	The honest slide. 12.5 is exactly between, so “nearest” does not decide it — we agreed to round up. Children are usually told 12.5 IS nearer 13, which is simply untrue, and they can tell.
8/8	6:30	The three-places task is the one to press on: same number, three different correct answers, each rounded from the original. Exit ticket after.