Math Success by DMTI

Rounding and Estimation

A Companion to DMT Insight 33 · For Teachers, Instructional Coaches, Principals, and Parents

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How to Use This

Use these three questions before reading the Insight or watching the video. Then return to them afterward. They can be used individually, in a team meeting, or as part of a coaching conversation.

Three Guiding Questions

Answer these before reading the Insight or watching the video. Then come back to them and see whether your thinking changed.

1. When a student rounds 47 to 50, does the answer rest on a digit or on a distance?
2. What is the student tracking: the rule about the neighbor digit, or how many complete tens the number holds?
3. Can the student show the decision on a number line, with both benchmarks and the halfway point?

Before and After: Showing the Shift

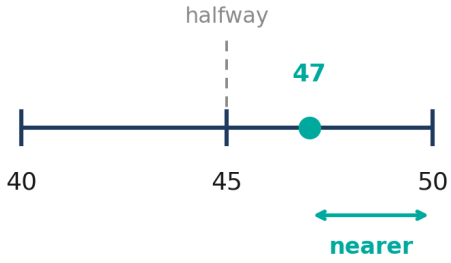
The important shift is from applying a rule about a digit to reasoning about proximity. Students locate the number between two benchmarks, identify the midpoint, and determine which benchmark is closer.

BEFORE

"7 is more than 5, so it goes up."

The answer rests on a digit.

AFTER

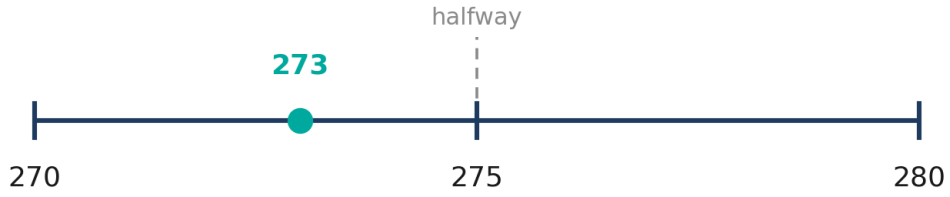


On the left, the student uses the digit 7 to apply a rule. On the right, 47 is located between 40 and 50. Since 45 is the midpoint and 47 is beyond 45, 47 is closer to 50.

Both students may answer 50 correctly. The difference is whether the student can explain the answer in terms of benchmarks, midpoint, and distance - reasoning that also works with numbers such as 3.98.

Worked Examples

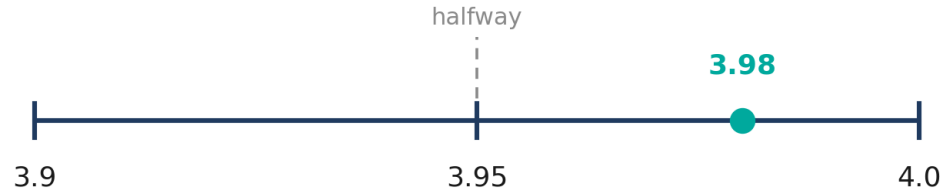
Rounding 273 to the nearest ten.



Identify the complete units of 10, identify the next unit of 10, and then compare the distances.

Say: "How many complete tens are in 273?" "Twenty-seven tens, which is 270." "What is the next ten?" "280." "Which is nearer, and how do you know?"

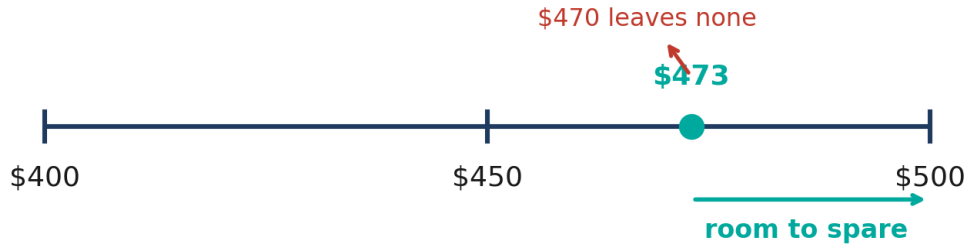
Rounding 3.98 to the nearest tenth.



The same reasoning applies to decimals. The unit changes from 10 to 1/10.

Say: "How many complete tenths are in 3.98?" "Thirty-nine tenths, which is 3.9." "What is the next tenth?" "4.0." "3.98 is almost all the way there, so it rounds to 4.0."

Estimating a $473 airfare for a budget.



Estimation requires an additional decision: Which benchmark is useful for the estimate?

Say: "We are building a budget. Would $470 or $500 be the more useful estimate? Why?" Then ask students to explain how the purpose of the estimate affects the benchmark they choose.

The Language Shift

Use language that directs students toward units, benchmarks, midpoint, and distance.

Instead of	Say
"Look at the digit next door."	"How many complete tens are in this number?"
"Five or more, let it soar."	"Where is halfway, and which side is our number on?"
"Round it off."	"Which benchmark is nearer, and how do you know?"
"Just estimate it."	"What are we using the estimate for? Which benchmark fits that purpose?"

Across the Grades (3 to 6)

The same structure extends across the grades: locate a number between two benchmarks, identify the midpoint, and reason about which benchmark is closer.

Grade band	Example	Model	The shift it asks for
Grade 3	Round 47 to the nearest ten. How many complete tens? What is the next ten?	Number line	From a rule about digits to a judgment about distance.
Grades 4-5	Round 2,987 to the nearest hundred, then 3.98 to the nearest tenth.	Open number line, place-value chart	From tens to any place value, with halfway as the deciding factor.
Grade 6	A flight costs $473. Estimate it for a budget. Why might $500 serve better than $470?	Number line, bar model	From rounding a number to choosing a benchmark that fits the purpose.

Where to Go Next

- The Insight: "Rounding and Estimation: Reasoning About Proximity and Magnitude."
- The short video that accompanies the Insight, at dmtinstitute.com/research.
- More at mathsuccess.io and dmtinstitute.com.

To access the Math Learning Profile (MLP), Targeted Activities, and more, visit mathsuccess.io.