Rounding to any place

A town has 8,472 people, but "about 8,000" or "about 8,500" often says enough. How do you find the nearby number that ends in zeros and is closest?

WORDS TO KNOW

Round: trade a number for a nearby number that ends in zeros from some place on. You must say which place.

Neighbors: the two numbers on either side of your number that end in zeros from the rounding place on. To the nearest hundred, the neighbors of 638 are 600 and 700.

Halfway mark: the point exactly between the two neighbors, such as 650.

Deciding digit: the digit just to the right of the rounding place.

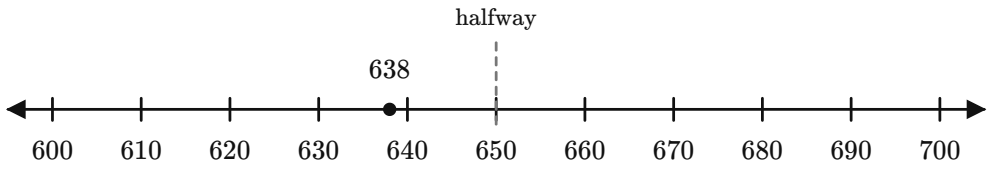
≈: "is about". Write 638 ≈ 600, not 638 = 600.

KEY IDEAS

1. Pick the closer neighbor

Find the two neighbors, then see which one your number is closer to. On the line, 638 is short of the halfway mark 650, so it is closer to 600. To the nearest ten, its neighbors are 630 and 640, and it is past 635, so it is closer to 640.

> Rounding to a different place can give a different answer: 638 ≈ 640 to the nearest ten, but 638 ≈ 600 to the nearest hundred.



2. One digit decides

The halfway mark always has a 5 just right of the rounding place. So you only need the deciding digit. Digits further right can never change the answer.

> Deciding digit 0, 1, 2, 3 or 4: keep the lower neighbor. The rounding digit stays the same.
>
> Deciding digit 5, 6, 7, 8 or 9: take the upper neighbor. The rounding digit goes up by one.
>
> Either way, digits to the left stay as they are, and every digit to the right becomes 0.

A number exactly on the halfway mark is just as close to both neighbors. The rule this lesson uses, like most schoolbooks, is **halfway rounds up**. So 750, exactly halfway between 700 and 800, gives 750 ≈ 800 to the nearest hundred.

3. A 9 carries

If the rounding digit is 9 and it must go up, it becomes ten. A place cannot hold ten, so trade it for one more in the place to its left. The 9 becomes 0 and the digit to its left goes up by one. This is the only way a digit to the left of the rounding place can change.

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WATCH OUT

- **Look at the deciding digit, not the last digit.** For 2,148 to the nearest hundred, the deciding digit is the tens digit, 4. The 8 does not matter, so 2,148 ≈ 2,100.
- **Rounding up is more than writing zeros.** If the deciding digit is 5 or more, the rounding digit must go up by one, or you have written the lower neighbor.
- **A rounded number is a different number.** Write ≈, never =.

WORKED EXAMPLES

Example 1. Round 347 to the nearest ten and to the nearest hundred.

1. Nearest ten: the neighbors are 340 and 350, with halfway mark 345. The deciding digit is the ones digit, 7. That is 5 or more, so take 350.
2. Nearest hundred: the neighbors are 300 and 400, with halfway mark 350. The deciding digit is the tens digit, 4. That is less than 5, so keep 300.

Answer: 347 ≈ 350 to the nearest ten and 347 ≈ 300 to the nearest hundred. **Check:** 347 is 3 from 350 but 7 from 340, and 47 from 300 but 53 from 400.

Example 2. Round 947,281 to the nearest thousand, ten thousand and hundred thousand.

1. Thousand: the deciding digit is the hundreds digit, 2. Keep the thousands digit 7: 947,000.
2. Ten thousand: the deciding digit is the thousands digit, 7. The ten thousands digit goes from 4 to 5: 950,000.
3. Hundred thousand: the deciding digit is the ten thousands digit, 4. Keep the hundred thousands digit 9: 900,000.

Answer: 947,281 ≈ 947,000, 947,281 ≈ 950,000 and 947,281 ≈ 900,000. The bigger the place, the simpler the number, and the farther it can be from the real one.

Example 3. Round 39,640 to the nearest hundred and to the nearest thousand.

1. Nearest hundred: the deciding digit is the tens digit, 4. Keep the hundreds digit 6: 39,600.
2. Nearest thousand: the deciding digit is the hundreds digit, 6, so round up. The thousands digit is 9, and one more makes ten.
3. Ten thousands make one ten thousand, so trade them. The thousands digit becomes 0, and the ten thousands digit goes from 3 to 4.

Answer: 39,640 ≈ 39,600 to the nearest hundred and 39,640 ≈ 40,000 to the nearest thousand. **Check:** the neighbors for thousands are 39,000 and 40,000, and 39,640 is past the halfway mark 39,500.

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