

Rounding and Estimating Large Numbers


We can round numbers to the nearest ten, to the nearest hundred, to the nearest thousand, to the nearest ten thousand, to the nearest hundred thousand, and so on—to *any* unit of place value. No matter what place value unit we are rounding to, the **rules of rounding** are the same.

Rules of rounding whole numbers

Look at the digit AFTER the place you are rounding to:

- If that digit is 0, 1, 2, 3, or 4, then round DOWN.
- If that digit is 5, 6, 7, 8, or 9, then round UP.
- Change to zeros all the digits *after* the place you are rounding to.
- If rounding up, the digit in the place you are rounding to is increased by 1.

Remember, the squiggly equals sign (“ \approx ”) is read “is about,” or “is approximately.”

To help us, let's draw a line  between the digit we are rounding to and the next smaller one.

Rounding to the nearest TEN: $2,5\overline{6}7 \approx 2,57\overline{0}$ $395,84\overline{9} \approx 395,85\overline{0}$	Rounding to the nearest HUNDRED: $2,5\overline{6}7 \approx 2,6\overline{00}$ $395,8\overline{4}9 \approx 395,8\overline{00}$	Rounding to the nearest THOUSAND: $23,\overline{8}02 \approx 24,\overline{000}$ $980,\overline{0}97 \approx 980,\overline{000}$
Rounding to the nearest TEN THOUSAND: $72,\overline{6}451 \approx 73,\overline{000}$ $95,\overline{3}987 \approx 95,\overline{000}$	Rounding to the nearest HUNDRED THOUSAND: $8,\overline{6}7,300 \approx 9,\overline{00},000$ $1,\overline{2}6,835 \approx 1,\overline{00},000$	

1. Round the numbers as the dashed line indicates (to the underlined digit).

a. $4\overline{5}2,550 \approx$	b. $8\overline{6},256 \approx$	c. $77,\overline{5}79 \approx$
d. $24\overline{5},250 \approx$	e. $\overline{8}94,077 \approx$	f. $38\overline{5},706 \approx$
g. $\overline{6}15,493 \approx$	h. $\overline{5}27,009 \approx$	i. $\overline{2}52,000 \approx$
j. $\overline{2}6,566 \approx$	k. $94\overline{4},032 \approx$	l. $33\overline{5},700 \approx$
m. $48,4\overline{2}1 \approx$	n. $8,\overline{5}55 \approx$	o. $40\overline{9},239 \approx$

A note about 9

If you are rounding up, and the digit that you need to increase by one is a 9, you have to make it a 10—that means the digit in the *next higher* place will *also* increase by one.

Here is a simpler way to understand it: just look at the *two* (or three or four) digits to the left of your rounding line, and increase that “number” by one:

$$329,509 \approx 330,000$$

The “29” changes to “30”.

$$998,271 \approx 1,000,000$$

The “99” changes to “100”.

$$639,995 \approx 640,000$$

The “3999” changes to “4000”.

2. Round the numbers as the dashed line indicates (to the underlined digit).

a. 10, <u>9</u> :65 ≈	b. 8 <u>9</u> :506 ≈	c. 7 <u>9</u> :7,329 ≈
d. 29 <u>9</u> :850 ≈	e. 254,9 <u>9</u> :7 ≈	f. 599,9 <u>9</u> :72 ≈

3. Round the numbers to the underlined place value unit.

a. 233, <u>5</u> 64 ≈	b. 75 <u>2</u> ,493 ≈	c. 1 <u>9</u> 2,392 ≈
d. 8 <u>9</u> 5,080 ≈	e. <u>8</u> 55,429 ≈	f. 3 <u>9</u> 9,477 ≈

4. Round these numbers to the nearest thousand, nearest ten thousand, and nearest hundred thousand.

<i>number</i>	274,302	596,253	709,932	899,430
to the nearest 1,000				
to the nearest 10,000				
to the nearest 100,000				

5. Round the numbers to the nearest hundred. (*Note: The numbers below take into account how many leap years you have likely lived.*)

- In 5 years, you have likely lived 1,826 days, or about _____ days.
- In 9 years, you have likely lived 3,287 days, or about _____ days.
- In 10 years, you have likely lived 3,652 days, or about _____ days.
- In 20 years, you have likely lived 7,305 days, or about _____ days.
- In 40 years, you have likely lived _____ days, or about _____ days.
- A challenge: figure out about how many days your mom, dad, or teacher has lived.

One more “quirky” thing. Let’s say you are asked to round 284 to the nearest *thousand*. Notice 284 does NOT have *any thousands!* You can say it has zero thousands and write it as 0,284 to show that.

0,284 \approx 0,000 or just plain zero. But 0,603 \approx 1,000, or is rounded up to one thousand.

Similarly, rounded to the nearest ten thousand, 284 \approx 0 (or 00,284 \approx 00,000). Of course, the same thing happens with any bigger place value unit that you are rounding to.

6. Round the numbers to the nearest ten thousand.

a. 235 \approx	b. 18,299 \approx	c. 1,392 \approx
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7. Round the numbers to the nearest thousand.

a. 865 \approx	b. 182 \approx	c. 5,633 \approx
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8. Round the numbers to the nearest ten thousand.

a. 56,250 \approx	b. 5,392 \approx	c. 2,938 \approx
d. 708,344 \approx	e. 599 \approx	f. 44,800 \approx

9. Use rounded numbers to solve these problems.

a. *Round the numbers to the nearest thousand.*

There are 235,792 people in Purpletown, and 187,203 people in Bluetown.

That means about _____ people in Purpletown, and about _____ people in Bluetown. The two towns have approximately _____ people in all.

There are about _____ more people in Purpletown than in Bluetown.

b. *Round the numbers to the nearest hundred.*

Last year, there were 2,384 live births in Seagull hospital, and 1,094 in Sunshine hospital.

There were about _____ live births in total in those two. Seagull hospital had about _____ more births than Sunshine hospital.

c. *You decide how to round the number.*

Jake’s yearly earnings are \$47,807.

That means about \$ _____.

So, he earns about _____ *monthly*.

d. *You decide how to round the number.*

Jack drove 58,496 miles last year.

That is about _____ miles. This means

he drives about _____ *each month*.

10. Both anatomy and astronomy often contain big numbers!

If you travel around the earth one time on the equator, your trip is 24,900 miles long!
If you laid out an adult human's blood vessels, they would be 93,200 miles long!

a. Round the two numbers to the nearest thousand in the spaces below:

The trip around the equator is about _____ miles.

An adult human's blood vessels go for about _____ miles.

So, how many whole loops around the earth would those blood vessels go? _____ loops

b. The Moon lies at an average distance of 238,857 miles from the earth.
Round this number to the nearest thousand.

c. How many adults' blood vessels would you need to lay out to reach from the Earth to the moon?

d. One cubic milliliter of blood (TINY TINY amount) normally has between 4,000 and 10,000 white blood cells, and between 150,000 and 400,000 platelets.

Suppose someone has 50,000 white blood cells in that amount of blood.
Is their white blood cell count high or low or normal?

Let's say they also have 10,000 platelets in that amount of blood.
Is their platelet count is high or low or normal?

That person is sick with something!

e. There are about 100,000 hairs on the top of your head.
You lose about 100 of them when you brush your hair.
About how many do you have now?

Should you worry about getting to be bald if this continues for a while?

f. Check your science book for other big numbers. You can write them below.