Rounding Numbers

Objective 1 Understand Rounding Numbers using a Number Line

Consider the number line below. Explain what it means to round to the nearest 10?

$$\longleftarrow \!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!\longrightarrow$$

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70
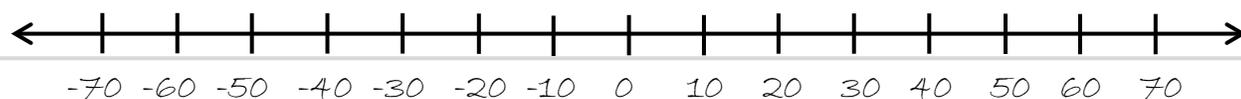
Example 1: Use the number line above to round 34 to the nearest 10.

The number 34 is between ___ and ___ on the number line. Since 34 is closer to ___ than to ___ , 34 rounded to the nearest 10 is ___.

> Note: In the cases where the number falls in the middle, we round up to the nearest 10!

> Answer the following homework questions.

In Exercises 1 - 9, use the number line to round the given number to the nearest 10.

$$\longleftarrow \!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!-\!\!|\!\!\longrightarrow$$

-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70
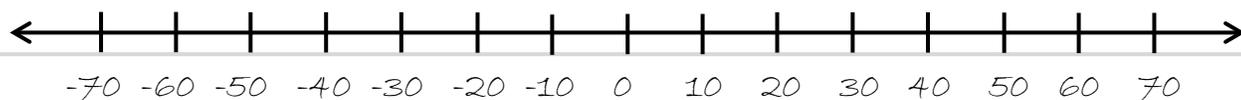
1) 59   4) -26   7) -4

2) 44   5) -5   8) 5

3) 65   6) -45   9) 74

Next, let's use a number line to determine how to round a number to the nearest hundred. In this case, we require a number line that is labeled with only hundreds.

$$\longleftarrow \quad \underset{39,300}{|} \quad \underset{39,400}{|} \quad \underset{39,500}{|} \quad \underset{39,600}{|} \quad \underset{39,700}{|} \quad \underset{39,800}{|} \quad \underset{39,900}{|} \quad \underset{40,000}{|} \quad \longrightarrow$$
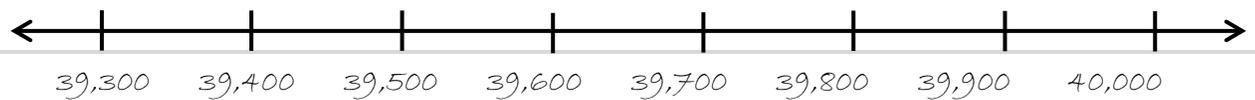
Example 2: Use the number line above to round 39,455 to the nearest hundred.

The number 39,455 is between _____ and _____ on the number line. Since 39,455 is closer to _____ than to _____ , 39,455 rounded to the nearest hundred is _____ .

Objective 2 | # Learn how to Round Numbers

Sometimes we only want an approximation to a given quantity, or maybe we want to approximate a sum.

Suppose we want to approximate the sum 485 + 337 + 196. If we rounded each number to the nearest hundred, we would have 500 + 300 + 200 = 1,000.

The exact value of 485 + 337 + 196 is equal to 1,018 and our approximation of 1,000 is relatively close to the actual value.

The procedure for rounding positive whole numbers is summarized below.

Rounding Positive Whole Numbers

First locate the digit that is one place to the right of the place value you want to round to.

If that digit is less than 5, replace it and all digits to the right with zeros.

If the digit is greater than or equal to 5, replace it and all digits to the right with zeros and add 1 to the digit to its left.

Example 3: Round the following numbers to the nearest one-thousand.

a) 32,439

The 2 is in the one-thousands place value.

The digit to the right is less than 5.

32,439

Remains unchanged.   Replace with zeros.

32,000
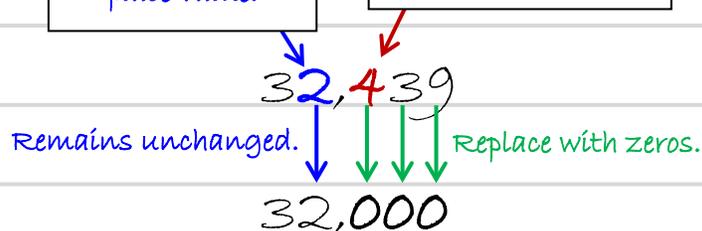
b) 10,506

The 0 is in the one-thousands place value.

The digit to the right is greater than or equal to 5.

10,506

Add 1. Replace with zeros.

11,000
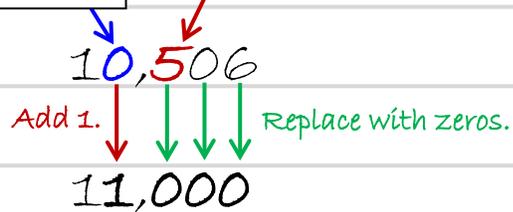
Example 4: Round the following numbers to the nearest hundred.

a) 895,684

The 6 is in the hundreds place value.

The digit to the right is greater than or equal to 5.

895,684

Add 1. Replace with zeros.

895,700
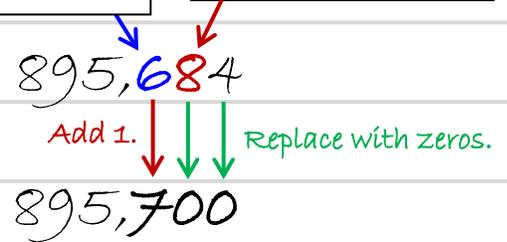
b) 5,960

The 9 is in the hundreds place value.

The digit to the right is greater than or equal to 5.

5,960

Add 1. Replace with zeros.

6,000 $\circlearrowright +1$
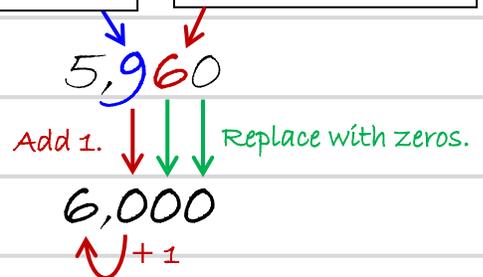
Note: Adding a 1 to the 9 requires that we carry over a 1 to the one-thousands place value.

Answer the following homework questions.

In Exercises 10 – 15, round each number to the nearest ten-thousand.

10) 381,520   12) 4,605,267   14) 8,742,097,404

11) 100,095   13) 50,909,613   15) 6,058,355,000

In Exercises 16 – 21, round each number to the nearest ten.

16) 76   18) 187   20) 5,999

17) 5   19) 395   21) 13,999

In Exercises 22 – 25, first find the sum. Next, estimate the sum by first rounding each number to the nearest hundred. Compare your results.

22)   376   23)   945   24)   154   25)   6,952
       104   363   26   7,805
    + 285   + 807   + 12   + 5,481