

COMPARING AND ROUNDING NUMBERS

A COMPARING NUMBERS

Definition Comparing Numbers

Comparing is looking at two or more numbers to see which is greater (bigger), less (smaller), or if they are equal (the same amount).

Definition Comparison Symbols

We use special symbols to write down our comparisons:

Symbol	Meaning	Example
=	is equal to	$4 = 4$
>	is greater than	$4 > 2$
<	is less than	$3 < 5$

Helpful Trick: The Alligator Mouth

Think of the $>$ and $<$ symbols as a hungry alligator's mouth. The alligator always wants to eat the **bigger** number!

4  2 3  5
 $4 > 2$ $3 < 5$

The open mouth always faces the bigger number.

Method Procedure for Comparing Whole Numbers

To compare any two whole numbers, follow this systematic procedure:

1. **Compare the number of digits.** The number with more digits is the greater number. If they have the same number of digits, proceed to the next step.
2. **Compare the leftmost digits.** Begin with the digit in the largest place value for each number. The number with the larger digit in this position is the greater number.
3. **Proceed to the next digit if necessary.** If the leftmost digits are identical, move one place value to the right and compare the digits in that position.
4. **Repeat the process.** Continue this process from left to right until you find a position where the digits differ. The number with the larger digit in this position is the greater number. If all digits are identical, the numbers are equal.

Ex: Compare 352 and 289.

Answer:

- Both numbers have 3 digits. We proceed to compare the leftmost digit (hundreds place).
- The number 352 has a **3** in the hundreds place.
- The number 289 has a **2** in the hundreds place.
- Since $3 > 2$, it is concluded that **352 > 289**. No further comparison is necessary.

B BOUNDING A NUMBER

Definition Bounding a Number

Bounding a number involves identifying the two consecutive multiples of a given place value (e.g., ten, hundred, thousand) between which the number lies. This is also known as "framing" or "bracketing" the number.

Method Procedure for Bounding

To bound a number by a specific place value:

1. **Determine the lower bound.** Keep the digits to the left of the target place value and zero out the digits to its right.
2. **Determine the upper bound.** Add one to the digit in the target place value and replace all digits to its right with zeros.

Ex: Bound the number 365 by the nearest hundred.

Answer:

- The target place value is the hundreds. The digit is 3.
- **Lower Bound:** Keep the 3, replace subsequent digits with zeros. The lower bound is 300.
- **Upper Bound:** Add 1 to the hundreds digit ($3 + 1 = 4$), replace subsequent digits with zeros. The upper bound is 400.
- Therefore, 365 is bounded by 300 and 400. This can be written as $300 \leq 365 < 400$.

C ROUNDING NUMBERS

Method Standard Procedure for Rounding

To round a number to a specific place value, the following procedure is applied:

1. **Identify the target digit:** Locate the digit in the place value to which you are rounding.
2. **Examine the adjacent digit:** Observe the digit immediately to the right of the target digit.
3. **Apply the rounding rule:**
 - If the adjacent digit is 5 or greater (5, 6, 7, 8, 9), increment the target digit by one. This is termed **rounding up**.
 - If the adjacent digit is 4 or less (0, 1, 2, 3, 4), the target digit remains unchanged. This is termed **rounding down**.
4. **Zero out subsequent digits:** Replace all digits to the right of the target digit with zeros.

Ex: Round the number 365 to the nearest hundred.

Answer: The procedure is executed as follows:

- 365 1. The target digit in the hundreds place is 3.
- 365 2. The digit to its right is 6.
3. As $6 \geq 5$, the target digit is rounded up: $3 + 1 = 4$.
- 400 4. Subsequent digits are replaced with zeros.

Therefore, 365 rounded to the nearest hundred is 400.