NAME_____

Module 5 **Decimal Operations, Exponents, and Powers**
Lesson 7 **Scientific Notation**

Lesson Notes 5.7

Lesson Objectives

- Demonstrate an understanding of place values using powers of 10 and write numbers greater than one in scientific notation with and without appropriate technology.
- Convert between scientific notation and standard notation using numbers greater than one.
- Convert between scientific notation and standard notation using numbers from zero to one.

Subtopic 1 Powers of Ten with Integer Exponents

- Powers of 10 with integer exponents are _____.
- To write a power of 10 greater than or equal to 1, count the number of _____ in the number. Use that number as the _____.
- To write a power of 10 that is less than 1, count the number of _____ after the _____. Use the _____ of that number as the exponent.
- To evaluate 10^n for n _____ or _____to 0, write 1 followed by n zeros.
- To evaluate 10^n for n _____ 0, write 1 in the nth decimal place, preceded by as many zeros as necessary.

Write as a Power of 10.

1 1,000,000

2 0.00001

Evaluate.

3 10^7

4 10^{-7}

Subtopic 2 Multiply by a Power of Ten with an Integer Exponent

- To multiply by a power of 10 with a nonnegative integer exponent, move the decimal point one place to the _____ for every power of 10.
- To multiply by a power of 10 with a negative integer exponent, move the decimal point one place to the _____ for every negative power of 10.
- A number is written in _____ when it is expressed as a sum of products of each digit and its place value.

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Multiply.

5 14.25×10^3

6 0.35×10^{-1}

7 Write 4.075 in expanded form.

Subtopic 3 Scientific Notation

- Scientific notation presents a way to write numbers that are very _____ or very_____ .
- A number written in scientific notation is the _____ of a number that is at least _____ but less than _____ and a power of _____ in exponential form.

Tell whether the number is written in scientific notation.

8 5.6×10^7 **9** 0.4×10^{-5} **10** 8×10^{87}

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Subtopic 4 Converting Between Standard and Scientific Notation

Writing a number greater than one in scientific notation

- Move the decimal point so only one _____ is before the decimal point.
- Count the _____ moved from the original decimal point.
- The number of places counted is the _____.
- If the count is to the _____ of the 1st nonzero digit, the exponent is positive.

Writing a number less than one in scientific notation

- Move the decimal point so only one nonzero number is before the decimal point.
- Count the number of places moved from the _____.
- The number of places counted is the _____.
- If the count is to the left of the 1st nonzero digit, the exponent is _____.

11 Write 876,000 in scientific notation.

12 Write 6.12×10^{-4} in standard notation.

13 Write 0.00000024 in scientific notation.

14 Write 4.5×10^{-2} in standard notation.

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