**Unit 1 - Exponents and Scientific Notation**

Lesson 1: Writing Powers.
Objective: Today we will use powers and exponents to write large and small numbers.
Standard: 8.EE.1

**Powers**

A product of repeated factors can be expressed as a \_\_\_\_\_\_\_.



**Examples**:

1. Write the expression using exponents.
2. Write the expression using exponents.
3. Evaluate

 Perfect Squares Perfect Cubes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IntegerSquared | PerfectSquare |  | IntegerCubed | Perfect Cube |
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Lesson 2: Evaluating Expressions with Exponents.
Objective: Today we will evaluate expressions using exponents.
Standard: 8.EE.1

**Evaluating Exponents**

When you are evaluating expressions you must follow the
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

PEMDAS helps us to remember the rules.

P

E

M & D

A & S

**Examples:**

Evaluate each expression is and .

Lesson 3: The Product Law of Exponents
Objective: Today we will simplify real number expressions by multiplying monomials.
Standard: 8.EE.1

**Product of Powers**

To multiply powers with the same base, \_\_\_ their exponents.

A \_\_\_\_\_\_\_\_\_ is a number, a variable, or a product of a number and one or more variables. (One Term)

**Examples:**

Simplify using the Laws of Exponents.

Lesson 4: The Product Law of Exponents
Objective: Today we will simplify real number expressions by multiplying monomials.
Standard: 8.EE.1

**Product of Powers**

When you are multiplying powers that involve variables, there is always a \_\_\_\_\_\_\_\_\_\_\_\_\_.

To multiply powers with a coefficient you \_\_\_\_\_\_\_\_ the coefficients and \_\_\_\_ the exponents.

**Examples:**

Simplify using the Laws of Exponents.

Lesson 5: The Quotient Law of Exponents
Objective: Today we will simplify real number expressions by dividing monomials.
Standard: 8.EE.1

**Quotient of Powers**

To divide powers with the same base, \_\_\_\_\_\_\_\_\_\_\_ their exponents.



**Examples:**

Simplify using the Laws of Exponents.

Lesson 6: The Quotient Law of Exponents
Objective: Today we will simplify real number expressions by dividing monomials.
Standard: 8.EE.1

**Quotient of Powers**

When you are dividing powers that involve variables, there is always a \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

To divide powers with a coefficient you \_\_\_\_\_\_\_ the coefficients and \_\_\_\_\_\_\_\_\_\_\_ the exponents.

**Examples:**

Simplify using the Laws of Exponents.

Lesson 7: Powers of Monomials.
Objective: Today we will use laws of exponents to find powers of monomials.
Standard: 8.EE.1

**Power of a Power**

To find the power of a power, \_\_\_\_\_\_\_\_\_\_\_\_ the exponents.



**Examples:** Simplify using the Laws of Exponents

1.

2.

Lesson 8: Powers of Monomials.
Objective: Today we will use laws of exponents to find powers of monomials.
Standard: 8.EE.1

**Power of a Product**

To find the power of a product, find the power of each \_\_\_\_\_\_ and multiply.



**Examples:** Simplify using the Laws of Exponents.

1.

2.

Lesson 9: Zero and Negative Exponents.
Objective: Today we will write and evaluate expressions using zero and negative exponents.
Standard: 8.EE.1

**Zero Exponent**

Any number to the power of 0 is equal to 1.

**Examples:** Simplify using the Laws of Exponents.

**Negative Exponents**

Any number to a negative power is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_\_\_\_ of the power.

**Examples:** Simplify using the Laws of Exponents.

1. 2.
2. 4.

Lesson 10: Multiply and Divide with Negative Exponents.
Objective: Today we will simplify expressions involving zero and negative exponents.
Standard: 8.EE.1

**Multiply and Divide with Negative Exponents**

To multiply and divide powers with negative exponents, you can use the \_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Examples:**

Simplify each expressions using the Laws of Exponents.

Lesson 11: Scientific Notation
Objective: Today we will identify and understand numbers written in scientific notation.
Standard: 8.EE.3

**There are 2 parts to a number in scientific notation.**

**Scientific Notation** is a format used to write very large or very small numbers. It saves space and makes comparing numbers easier. It is often used in science for long distances or small sizes.

1. A number between \_\_\_\_\_\_\_\_.
2. A power of \_\_\_\_\_.

**Example:**

 is correct scientific notation

 is not correct scientific notation

Are the numbers below in correct scientific notation?

1. 2. 3. 4.



Do the numbers below represent whole numbers or decimals?

1. 2. 3. 4.

**Real Life Situations:**

When is it appropriate to use scientific notation in real life?

|  |  |
| --- | --- |
| **Examples of large numbers:** | **Examples of small numbers:** |
| Weight of a planet | Size of a blood cell |
| Distance between the sun and moon | An organism viewed under a microscope |
| Seconds you’ve lived in a lifetime | The width of a hair molecule |

Determine if the number in scientific notation would be written with a positive or negative exponent:

1. The weight of 10 Mack trucks.
2. The width of a grain of sand.
3. The size of a cheek cell.
4. The mass of Earth.

Lesson 12: Converting from Standard Form to Scientific Notation.
Objective: Today we will convert numbers from standard form to scientific notation.
Standard: 8.EE.3

**Expressing a number in scientific notation:**

1. Place the \_\_\_\_\_\_\_\_\_\_\_ so that there is one \_\_\_\_\_\_\_\_\_ digit to the left of the decimal point.
2. Count the number of decimal places the decimal has \_\_\_\_\_\_ from the original number. This will be the \_\_\_\_\_\_\_\_\_\_ of 10.
3. If the original number was **less than 1**, the exponent is \_\_\_\_\_\_\_\_\_.
If the original number was **greater than 1**, the exponent is \_\_\_\_\_\_\_\_\_.

|  |
| --- |
| **Remember:**If it is a whole number The exponent is \_\_\_\_\_\_\_\_\_If it is a decimal The exponent is \_\_\_\_\_\_\_\_\_ |

**Examples:**

**Try It!**

1. 2. 3.

Lesson 13: Converting from Scientific Notation to Standard Form.
Objective: Today we will convert numbers from scientific notation to standard form.
Standard: 8.EE.3

**Expressing a number in standard form:**

1. Move the decimal to the right for \_\_\_\_\_\_\_\_\_ exponents of 10. The \_\_\_\_\_\_\_\_\_\_\_\_ tells you how many places to move.
2. Move the decimal to the left for \_\_\_\_\_\_\_\_\_\_ exponents of 10. The \_\_\_\_\_\_\_\_\_\_\_\_ tells you how many places to move.
3. Place \_\_\_\_\_\_\_ in any empty spaces.

**Examples:**

**Try It!**

1. 2. 3.

Lesson 13: Correcting numbers in scientific notation.
Objective: Today we will correct numbers written in scientific notation.
Standard: 8.EE.3

LARS (LeftADD RightSUBTRACT)

Fix each number so that it is in CORRECT scientific notation.

1. 2.
2. 4.
3. 6.

Lesson 14: Computing with Numbers in Scientific Notation.
Objective: Today we will compute with numbers written in scientific notation.
Standard: 8.EE.4

1. Type the numbers in to the calculator exactly as shown.
2. Make sure your answer is in the correct form of scientific notation.

**Examples:**

1.