

## Section 1-1: Exponential Notation

### Objectives:

Identify the base and exponent.  
Understand exponential notation.  
Use exponential notation to write repeated multiplication.  
Use prime factorization.  
Application problems.

### Part A: Understand Exponential Notation.

#### Vocabulary:

Base: \_\_\_\_\_  
Exponent: \_\_\_\_\_  
Power: \_\_\_\_\_

#### Example 1: Identify the base and exponent.

a) $1.2^6$	b) $(-4)^5$
base _____	base _____
exponent _____	exponent _____

#### Guided Practice: Identify the base and exponent in each expression.

1) $2^3$	2) $(-5)^4$
base _____	base _____
exponent _____	exponent _____

#### Example 2: Write in exponential notation. Tell whether each statement is correct. If it is incorrect, state the reason.

a) $2 \cdot 2 \cdot 2 = 6^2$	b) $(23)^4 = 23 \cdot 23 \cdot 23 \cdot 23$
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#### Guided Practice: Right or wrong? Explain.

a) $6^3 = 6 \cdot 6 \cdot 6$	b) $5 \cdot 5 = 2^5$
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Example 3: Write repeated multiplication using exponential notation.

a) $5 \cdot 5 \cdot 5 \cdot 5$	b) $(-3)(-3)(-3)(-3)(-3)$	c) $\left(\frac{1}{2}x\right) \cdot \left(\frac{1}{2}x\right) \cdot \left(\frac{1}{2}x\right)$
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Guided Practice: Write in exponential notation.

a) $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$	b) $(-4)(-4)(-4)$	c) $\left(\frac{2}{3}y\right) \cdot \left(\frac{2}{3}y\right) \cdot \left(\frac{2}{3}y\right) \cdot \left(\frac{2}{3}y\right)$
Base: _____	Base: _____	Base: _____
Exponent: _____	Exponent: _____	Exponent: _____

Example 4: Expand and evaluate each expression.

a) $2.5^3$	b) $(-4)^2$	c) $\left(\frac{2}{3}\right)^5$
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Guided Practice: Write in exponential notation.

a) $3^4$	b) $(-5)^3$	c) $\left(\frac{3}{4}\right)^3$
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Part B: Use exponents to write the Prime Factorization of a number.

Example 5: Write the prime factorization of each number in exponential notation.

a) 81	b) 1,125	c) 1,470
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Guided Practice: Write the prime factorization of each number in exponential notation.

a) 625	b) 630
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Example 6: Solve a real-world problem using exponential notation.

- a) There are 20 bacteria in a given sample in a laboratory. During the early phase of culture growth, the number of bacteria keeps doubling every hour. How many bacteria are there after 3 hours?

- b) Shana deposits \$100 in a bank account that earns 5% interest, compounded yearly. How much will be in her account at the end of 5 years? (Formula:  $A = P(1 + r)^{nt}$ )

P= \_\_\_\_\_

n= \_\_\_\_\_

r= \_\_\_\_\_

Guided Practice: Solve a real-world problem using exponential notation.

- a) Karen ate at a restaurant. One day later, Karen told three friends about the restaurant. The day after that, each of the friends Karen had told about the restaurant told three more friends about the restaurant. If this pattern continued, how many friends were told about the restaurant five days after the Karen ate there?

- b) Dewin, at age 25, invests \$2,000 in his retirement account. It will earn 6% interest, compounded yearly. How much will be in his account when he retires at age 65? (Formula:  $A = P(1 + r)^n$ )

Number of year invested: \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

P= \_\_\_\_\_

n= \_\_\_\_\_

r= \_\_\_\_\_