Exponents and Factored Form

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Lecture Notes

Definitions

- **Factors** are numbers multiplied with each other and the answer is called the **product**.
- A **factored form** is when a number is written with all its factors having multiplication dots between each factor. Ex: $2 \cdot 2 \cdot 2$
- The **base** is the number that is being multiplied by itself. Ex: $\mathbf{6^2}$
- The **exponent** (power) represents how many times the base is multiplied by itself. Ex: 6^2
- An **exponential notation** (exponential form) is a number written as $\text{BASE}^{\text{EXPONENT}}$
- A **square** (or squared) is when the exponent is **2**.
- A **cube** (or cubed) is when the exponent is **3**.
- A **mathematical operator** is $+ \ - \ \times \ \div$ and others that we do not cover is this course.
- An **expression** is a set of numbers that may use a mathematical operator.
  - Ex: $3 + 4$ or 4^3 etc.
- To **simplify** a problem is to provide the answer in its most simple form. An example is reducing a fraction.
- To **evaluate** a problem is to perform a set of steps to find the answer.
- To find the **value** of a math problem is to obtain its *quantity*.
- **Standard form** (standard notation) is using the usual number format in the typical way we write numbers. Ex: 2,438 or 41 etc. Also, 2^3 is not in standard form, but 8 is, although they are equivalent.
- Expressions that are **equivalent** have the same value but are written differently.
  - Ex: $5 + 2$ and 7 Both of these expressions have the same value.

Identify the base and exponent. Then simplify the expression.

6^2

The base is 6.

The exponent is 2.

The expression simplified is 36.

Evaluate.

14^2

What is the meaning of this expression?

7^3

$7^3 =$ 7 • 7 • 7

(Type your answer as a product. Do not simplify.)

- The word "product" does not make sense here. The product is the answer, which is 343. But that is not what they want here…
- Instead, the problem should say, "Type your answer in factored form."

For the following factored form find the exponential notation and the simplified value.

2 • 2 • 2 • 2

The exponential notation of 2 • 2 • 2 • 2 is 2^4.

The simplified value of 2 • 2 • 2 • 2 is 16.

The exponential notation for a number is given as 7^3.

a. Find the factor form/repeated multiplication for 7^3.

b. Find the standard form for 7^3.

a. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The factor form/repeated multiplication for 7^3 is 7 • 7 • 7.

B. There is no factor form for 7^3.

b. The standard form for 7^3 is 343.

The factor form/repeated multiplication for a number is given as 12 • 12.

a. Find the exponential notation for 12 • 12.

b. Find the standard form for 12 • 12.

a. The exponential notation for 12 • 12 is 12^2.

b. The standard form for 12 • 12 is 144.