October 16, 2024
Wednesday

Section 1.7

To evaluate or simplify an exponent, take base times itself as many times as the exponent. Simplify one multiplication at a time.

Ex.

$$4^3 = 4 \cdot 4 \cdot 4$$
$$= 16 \cdot 4$$
$$= 64$$

A very common exponent is **2**. We call this an exponent of two, or a power of two, or two squared. We have numbers squared in many area problems.

Whole Number Squared	Expansion			Perfect Squares]
0^2	0	•	0	0
1^2	1	•	1	1
2^2	2	•	2	4
3^2	3	•	3	9
4^2	4	•	4	16
5^2	5	•	5	25
6^2	6	•	6	36
7^2	7	•	7	49
8^2	8	•	8	64
9^2	9	•	9	81
10^2	10	•	10	100
11^2	11	•	11	121
12^2	12	•	12	144
13^2	13	•	13	169
14^2	14	•	14	196
15^2	15	•	15	225

The inverse of a number squared is called a square root. We have a symbol $\sqrt{}$. The square root of 16 or in symbol form, $\sqrt{16}$, means what number times what number is 16, or what number squared is 16. The answer is 4. We write a square root problem as,
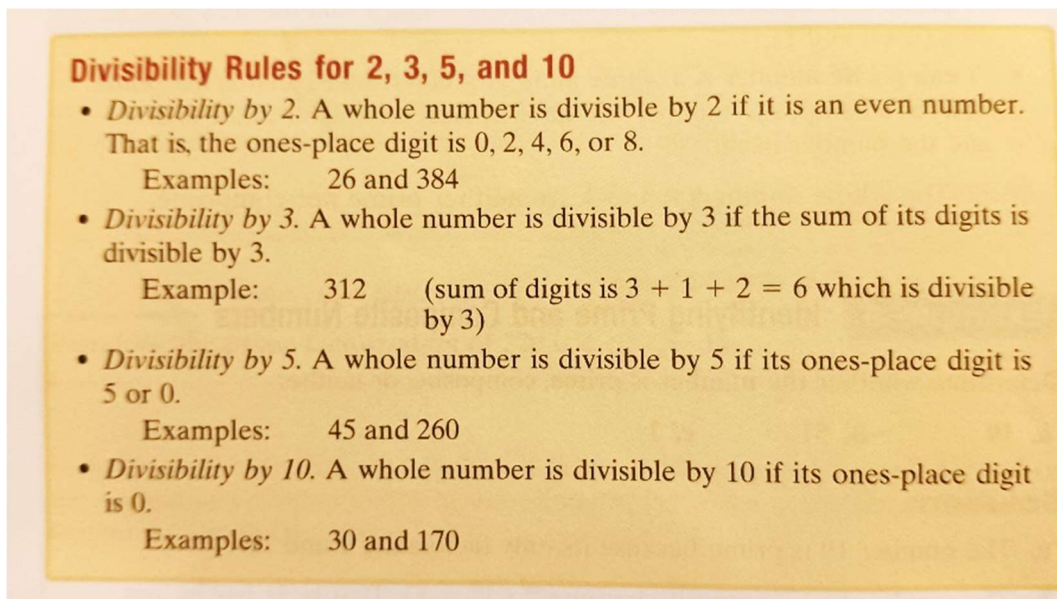
$$\sqrt{16} = 4$$

Please put the following chart in your notes and memorize the square roots of perfect squares.

Square Roots of Perfect Squares	Result
$\sqrt{0}$	0
$\sqrt{1}$	1
$\sqrt{4}$	2
$\sqrt{9}$	3
$\sqrt{16}$	4
$\sqrt{25}$	5
$\sqrt{36}$	6
$\sqrt{49}$	7
$\sqrt{64}$	8
$\sqrt{81}$	9
$\sqrt{100}$	10
$\sqrt{121}$	11
$\sqrt{144}$	12
$\sqrt{169}$	13
$\sqrt{196}$	14
$\sqrt{225}$	15

Please read all of section 2.2 carefully. The concept of factors is extremely important.

Section 2.2

Please put these yellow boxes from pages 107 and 108 in your notes.

Divisibility Rules for 2, 3, 5, and 10

- *Divisibility by 2.* A whole number is divisible by 2 if it is an even number. That is, the ones-place digit is 0, 2, 4, 6, or 8.

  Examples: 26 and 384

- *Divisibility by 3.* A whole number is divisible by 3 if the sum of its digits is divisible by 3.

  Example: 312   (sum of digits is $3 + 1 + 2 = 6$ which is divisible by 3)

- *Divisibility by 5.* A whole number is divisible by 5 if its ones-place digit is 5 or 0.

  Examples: 45 and 260

- *Divisibility by 10.* A whole number is divisible by 10 if its ones-place digit is 0.

  Examples: 30 and 170

Definition of Prime and Composite Numbers

- A **prime number** is a whole number greater than 1 that has only two factors (itself and 1).
- A **composite number** is a whole number greater than 1 that is not prime. That is, a composite number will have at least one factor other than 1 and the number itself.

Note: The whole numbers 0 and 1 are neither prime nor composite.

Prime Factorization

The **prime factorization** of a number is the factorization in which every factor is a prime number.

Note: The order in which the factors are written does not affect the product.

We know that the numbers multiplied together are called factors. **Factoring is the process of starting with a product or answer and rewriting as a product of factors**. We usually use a factor tree to factor a number to all prime factors. Two examples are shown. Please bring down all factors on each row. The book only shows bringing down factors that require more factoring.

or
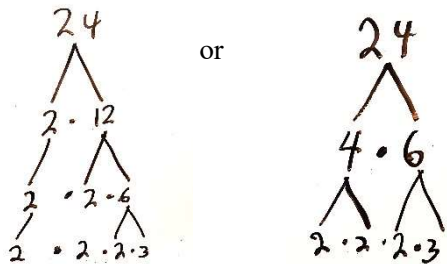
We do not put factors of **one** in a factor tree. We only put composite or prime factors in a factor tree. A factor tree of a prime number looks like,

17
prime

The prime factorization of 24 is,

$$24 = 2 \cdot 2 \cdot 2 \cdot 3$$

We can also list all factors of a number.

All factors of **24** are, **1, 2, 3, 4, 6, 8, 12, 24**. Knowing the timetables very well and quickly is very important in order to do factoring.