

Pre-Algebra



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Vital Concepts

- QuikNotes
- QuikCheck

Program

2

SD School Pre-Algebra Program 2: Vital Concepts



QuikNotes

Tree diagrams help us break BIG composite numbers down into the product of smaller prime numbers with exponents.

Prime factorization of a composite number is factoring the number into a product of prime numbers.

$$20 = 2^2 \times 5$$

The **greatest common factor** of two numbers is the largest factor that appears in both lists of factors

15: 1, 3, 5, 15

20: 1, 2, 4, 5, 10, 20

The greatest common factor of 15 and 20 is 5.

It is possible the **greatest common factor** of two numbers will equal 1.

15: 1, 3, 5, 15

28: 1, 2, 4, 7, 14, 28

The greatest common factor of 15 and 28 is 1.

When looking for the **greatest common factor of two or more numbers**:

1. Factor the numbers into primes.
2. Figure out which prime numbers are factors of each of our original numbers, and how many times each of those prime numbers is present.
3. Take the smallest exponent of each common factor and multiply those factors together.

Example: $15 = 3 \times 5$ and $20 = 2^2 \times 5$

The greatest common factor is 5.

A **multiple** is what you get when you multiply one number by another number.

The **least common multiple** is the lowest number that is a multiple of a set of numbers.

To find the **least common multiple**:

1. Factor the numbers into primes.
2. Take every prime number that appears as a prime factor in any of the numbers and write it once with the biggest exponent that appears.
3. Take the product of the primes raised to the biggest exponent to find the least common multiple.

Student Notes

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The **absolute value** of a number is the distance units away from zero on the number line. The absolute value of a number, x , is denoted by $|x|$.

The **absolute value** of 5 is 5. Likewise the absolute value of -5 is also 5, because -5 is also 5 units away from zero.

The absolute value of **zero** is **zero**.

The **square root** of a number, \sqrt{x} , is a second number, that when multiplied by itself gives the first number.

9 is the square root of 81, because $9 \times 9 = 81$.

$$9 = \sqrt{81}$$

The **radical sign** means the positive square root of a number. The square root of 9 is 3, even though -3 times -3 is also equal to 9.

In order to get the **negative root** of a number, use a negative sign in front of the radical. Not under the radical, but in front of it.

$$\sqrt{9} = 3 \quad -\sqrt{9} = -3$$

A **perfect square** is a number that has an integer square root. For example, some of the perfect squares are 1, 4, 9, 16, 25, 36, 49, 64, 81, and 100. They're perfect squares because their roots are integers.

In order to **simplify** a number under a radical, a perfect square can sometimes be factored out.

$$\sqrt{18} = \sqrt{9 \times 2} = 3\sqrt{2}$$

In order to find the **simplest form of a radical**, continue to factor out perfect squares until there are no more.

$$\sqrt{72} = \sqrt{6 \times 12} = \sqrt{2 \times 2 \times 2 \times 3 \times 3}$$

$$\sqrt{2 \times 2 \times 2 \times 3 \times 3} = 2 \times 3\sqrt{2} = 6\sqrt{2}$$

Student Notes

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True or False

1. Prime factorization of a composite number is writing the number as a product of primes.

2. The greatest common factor is a collection of all factors. _____
3. The absolute value of a number is the distance that the number is away from zero on the number line. _____
4. The square root of a number is that number divided by its own reciprocal. _____
5. In order to get the negative root of a number, you make the number inside the radical negative. _____
6. 36 is a multiple of 1, 2, 3, 4, 6, 9, 12 and 18. _____

Problem Solving

7. Factor 28 into primes.
10. Find the square root of 144.
13. Simplify $-\sqrt{81}$
8. Find the greatest common factor of 36 and 48.
11. Find the absolute value of 5.24, $-6\frac{1}{3}$ and -0.03.
14. Find the perfect squares of the numbers 5 through 10.
9. Find the least common multiple of 18 and 15.
12. Simplify $\sqrt{60}$
15. Find the greatest common factor of 63 and 50.

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