

Simplifying Radicals

Vocabulary for Radicals

Memorize these by making flashcards or using some other memory strategy.

Radical - The symbol that looks like a long-division sign, but has a hook in front. That hook may have a small number tucked into it which is called an *index*. The word *radical* is also used to represent a term that has a radical sign in it.

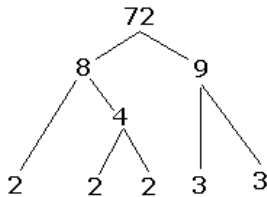
Radicand - The numbers and/or variables under the radical.

Index - The number of times a prime factor of the radicand must be repeated in order for that factor to be removed from under the radical. A square root has no written index; it has an assumed index of two. A cube root has an index of three.

Simplifying Radicals

Rather than identifying the largest root, I like to prime factor radicands, and then circle the groups indicated by the index. For example:

$$\sqrt{72} \quad (\text{Simplify the square root of 72})$$

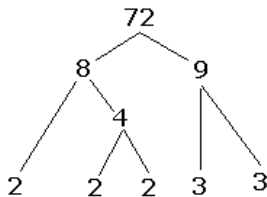


1. Prime factor

2. Square root (look for pairs): $\sqrt{2*2*2*3*3}$

3. Each pair is a square, so the square root of that comes forward: $2*3*\sqrt{2}$ and simplify: $6\sqrt{2}$

$$\sqrt[3]{72} \quad (\text{Simplify the cube root of 72})$$



1. Prime factor

2. Cube root (look for sets of three): $\sqrt[3]{(2*2*2*3*3)}$

3. Each set of three is a cube, so the cube root of that comes forward: $2*\sqrt{3*3}$ and simplify: $2\sqrt{9}$

When there are variables (letters) included, the exponent shows how many are there. For example, x^4 means $x * x * x * x$. So also circle pairs, or whatever the index is, and bring out one for each set.(or divide exp by index and leave remainder)

$$\sqrt[3]{72x^5} = \sqrt[3]{2*2*2*3*3*x*x*x*x*x} = 2x\sqrt[3]{9x^2}$$

Simplifying Radicals Practice Page

1. Prime factors of 48: _____

2. Write them under the radical: _____

3. For the square root (assumed index of 2), circle each factor that occurs twice in the prime factored radicand:

4. Cross out each pair and bring one of each pair to in front of the radical.

5. Simplify (multiply the numbers in front of the radical, and those left inside).

Now let's simplify the cube root of 48.

6. For the cube root (index of 3), circle each factor that occurs three times in the prime factored radicand:

7. Cross out each triple, and bring one from it to in front of the radical.

8. Simplify (multiply the numbers in front of the radical, and those left inside).

Repeat these processes on another page for:

24
40
 $56x^3$
 $32x^4y^5$