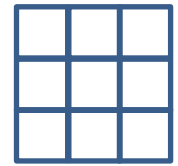


Essential Question: How do we simplify square root radicals?

Do Now: List the set of perfect square numbers from 1 to 225.



Square Roots

Are the numbers below rational or irrational? If rational, find the square root.

a. $\sqrt{100}$

b. $\sqrt{24}$

c. $\sqrt{\frac{25}{49}}$

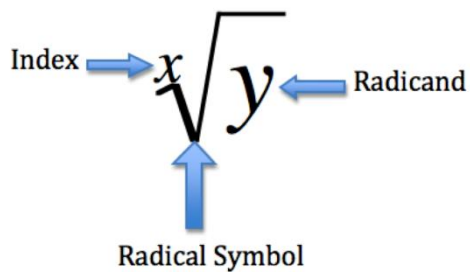
d. $\sqrt{6}$

e. $\sqrt{144}$

f. $\sqrt{32}$

Radical Expressions

An expression that uses a root, such as square root, cube root, etc...



Examples:

$\sqrt{16}$

index _____ radicand _____

$\sqrt[3]{8}$

index _____ radicand _____

$\sqrt[4]{81}$

index _____ radicand _____

If the _____ is not written, it is automatically a _____.

Question: What does it mean to "simplify"?

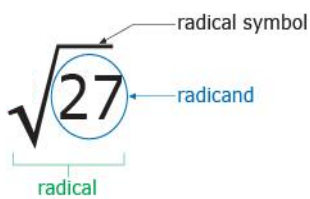


Think about the rational number $\frac{4}{8}$. Simplified, $\frac{4}{8}$ becomes $\frac{1}{2}$.

What do we know about $\frac{4}{8}$ and $\frac{1}{2}$?

Question: Is there a way to "simplify" square root expressions that are irrational?

Simplifying Square Root Radicals



In order to simplify irrational expressions in the form of square root radicals, we need to know the perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, etc...

Simplify: $\sqrt{27}$

1st: Find two factors of 27, one of which **must be** a perfect square (9 × 3)

2nd: Rewrite $\sqrt{27}$ as $\sqrt{9 \times 3}$ which is the same as $\sqrt{9} \times \sqrt{3}$

3rd: Rewrite $\sqrt{9} \times \sqrt{3}$ as $3 \times \sqrt{3}$, therefore, $\sqrt{27} = 3\sqrt{3}$

Let's try simplifying these radical expressions.

1. $\sqrt{8}$

2. $\sqrt{24}$

3. $\sqrt{50}$

4. $\sqrt{10}$

5. $\sqrt{32}$

6. $\sqrt{72}$

IT'S YOUR TURN NOW

7. $\sqrt{28}$

8. $\sqrt{300}$

9. $\sqrt{125}$

10. A rectangle has dimensions of 6 feet by 36 inches. What is the length of the diagonal of the rectangle? Express your answer in simplest radical form.



Some irrational numbers are expressed in radical form. These radical expressions can be simplified if the radicand can be factored into two numbers, one of which is a _____ . The simplified radical expression is _____ to the original radical expression.

Rewrite each radical expression in simplest radical form.

Reminder: Factor out the largest perfect square.

1. $\sqrt{20}$

2. $\sqrt{54}$

3. $\sqrt{75}$

4. $\sqrt{96}$

5. $\sqrt{200}$

6. $\sqrt{80}$

7. Charlie was asked to rewrite $\sqrt{216}$ in simplest radical form. His work and final answer is shown below.

$$\sqrt{216}$$

$$\sqrt{4} \cdot \sqrt{54}$$

$$2\sqrt{54}$$

Do you agree or disagree with Charlie's answer? Explain your reasoning.

8. Raleigh says that the irrational number $\sqrt{30}$ is not written in simplest radical form. Do you agree or disagree with this statement? Justify your response.