

Notes on Simplifying Radicals

Name _____

$\sqrt{\quad}$ means the "positive square root" of a number.

Consider $\sqrt{25}$. This means the "positive square root" of 25. To find it, ask yourself, "What positive number times itself equals 25?" **5**

Evaluate.

1. $\sqrt{49}$
7

2. $\sqrt{100}$
10

3. $\sqrt{1}$
1

4. $\sqrt{144}$
12

5. $\sqrt{0}$
0

A **radical** is any quantity with a radical symbol, $\sqrt{\quad}$.

'4' is the **coefficient**.
Technically, 4 is being multiplied by $\sqrt{10}$.

$$4\sqrt{10}$$

radical symbol house

'10' is the **radicand**.
The radicand is the number "in the house".

A **radical expression** is any expression that contains a radical.

The goal of this entire unit is to learn how to **simplify radicals**. To **simplify radicals** means to perform every operation possible and to make the radicand(s) as **small** as possible.

Thus, the critical part is that one must choose factors that are **perfect squares**.

If you cannot find a perfect square, ask yourself "Which prime number goes divides evenly into the radicand, and leaves me with a perfect square?"

Here are a list of prime numbers: 2, 3, 5, 7, 11, 13,

Simplify $\sqrt{45}$. Ask yourself, "Which prime number above divides evenly into 45?"

totally imperfect $\rightarrow 5 \cdot 9 \leftarrow$ perfect

$$3\sqrt{5}$$

6. Simplify $\sqrt{72}$.

totally imperfect $\rightarrow 2 \cdot 36 \leftarrow$ perfect

$$6\sqrt{2}$$

7. Simplify $\sqrt{42}$.

$$\sqrt{42}$$

Simplifying Radicals Practice

Date _____ Period _____

Simplify.

1) $\sqrt{80}$

$$\begin{array}{r}
 16 \overset{\wedge}{5} \\
 \boxed{4\sqrt{5}}
 \end{array}$$

$$\begin{array}{r}
 1 \ 80 \\
 2 \ 40 \\
 4 \ 20 \\
 \boxed{5 \ 16} \\
 8 \ 10
 \end{array}$$

2) $\sqrt{64}$

8

3) $\sqrt{20}$

$$\begin{array}{r}
 4 \ 5 \\
 \boxed{2\sqrt{5}}
 \end{array}$$

4) $\sqrt{27}$

$$\begin{array}{r}
 9 \ 3 \\
 \boxed{3\sqrt{3}}
 \end{array}$$

5) $\sqrt{48}$

$$\begin{array}{r}
 16 \ 3 \\
 4 \ 12 \\
 2 \sqrt{12} \\
 \swarrow \searrow \\
 4 \ 3 \\
 2 \sqrt{3} \\
 \boxed{4\sqrt{3}}
 \end{array}$$

6) $10\sqrt{40}$

$$\begin{array}{r}
 4 \ 10 \\
 2\sqrt{10} \\
 20\sqrt{10}
 \end{array}$$

7) $-5\sqrt{640}$

$$\begin{array}{r}
 64 \ 10 \\
 -5 \cdot 8\sqrt{10} \\
 \boxed{-40\sqrt{10}}
 \end{array}$$

8) $\sqrt{18m}$

$$\begin{array}{r}
 9 \ 2 \\
 \boxed{3\sqrt{2m}}
 \end{array}$$