$\qquad$
Date $\qquad$ Period $\qquad$

## Parts of a Radical



If $\qquad$ is not written, it is automatically a $\qquad$ .

For each radical, determine the index number and radicand.

$$
\sqrt{24}
$$

$\sqrt[3]{27}$
$\sqrt[4]{16 x y}$

$$
\sqrt{128 n^{8}}
$$

Write all the factor pairs for the given number, then circle the pairs that contain a perfect square.
$\underline{24} \quad \underline{48} \quad \underline{20} \quad \underline{80}$

In order to simplify square roots we must look for factors that are perfect squares.
For example: there are many ways to multiply two numbers to make 80.
We are only interested in the pair that contains a perfect square.
\(\sqrt{80} \begin{gathered}1 \cdot 80 <br>
2 \cdot 40 <br>

4 \cdot 10\end{gathered}\)| 2.16 |
| :--- |
| $\begin{array}{l}\text { which one is } \\ \text { less work? }\end{array}$ |

Alternate method is prime factorization.

$$
\sqrt{80}
$$

Simplify: (no calculator)
$\sqrt{20}$
$\sqrt{24}$
$\sqrt{25}$
$\sqrt{32}$
$\sqrt{165}$

Simplifying radicals
Give an exact answer and an approximate answer.
$\sqrt{12}$
$\sqrt{18}$
$\sqrt{48}$
$\sqrt{128}$

Exact answer: Exact answer: Exact answer: Exact answer:
Approximate: Approximate: Approximate: Approximate:

How do you simplify a radical if it is not a square root?
$\sqrt[3]{32}$
$\sqrt[3]{56}$
$\sqrt[4]{32}$

Simplify the following radicals. Leave answer in reduced radical form.
$\sqrt{48}$
$\sqrt[3]{48}$
$\sqrt[3]{54}$

What happens when there is a number out in front of the radical?
$3 \sqrt{8}$
$7 \sqrt{12}$
$5 \sqrt{24}$
$4 \sqrt[3]{24}$
$\sqrt{105}$
$\sqrt[3]{64}$
$\sqrt[3]{128}$

What happens when you have variables? Any patterns?
$\sqrt{x^{2}}$
$\sqrt{x^{3}}$

$$
\sqrt[3]{x^{3}}
$$

$\sqrt{x^{8}}$
$\sqrt{x^{10}}$

$$
\sqrt[3]{x^{2}}
$$

$$
\sqrt[3]{x^{8}}
$$

$$
\sqrt[3]{x^{10}}
$$

Quick Check:
$\sqrt{32 x^{2} y^{3}}$
$\sqrt[3]{64 x^{8} y^{6}}$

## Adding or Subtracting radicals

$4 \sqrt{3}+2 \sqrt{3}=$
$4 \sqrt{7}-6 \sqrt{7}=$
$\sqrt{24}+\sqrt{54}=$
$4 \sqrt{24}+3 \sqrt{54}=$

## Simplify:

$5 \sqrt[3]{2}-\sqrt[3]{16}=$
$2 \sqrt{3 x}+\sqrt{3 x}=$

$$
2 \sqrt{3}+5 \sqrt[3]{3}=
$$

$$
\sqrt{12 w}-\sqrt{27 w}
$$

