Simplifying Radicals

In This Unit:

1. Simple Radicands
2. Rationalize the Denominator

No Bellwork
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1. **Simple Radicands**
2. **Rationalize the Denominator**

Lesson 8.1
Simple Radicands

What You Need to Know:

A radical is a square root symbol $\sqrt{}$

A radicand is the number under the radical.

$$\frac{\sqrt{4}\cdot\sqrt{3}}{\sqrt{4\cdot3}}$$

Product Property: $\sqrt{ab}=\sqrt{a}*\sqrt{b}$

$$\sqrt{3\cdot2}=\sqrt{3}\cdot\sqrt{2}$$

Quotient Property: $\sqrt{\dfrac{a}{b}}=\dfrac{\sqrt{a}}{\sqrt{b}}$

$$\sqrt{\frac{3}{2}}=\frac{\sqrt{3}}{\sqrt{2}}$$

To simplify a radical, you MUST know at least the first 15 perfect squares.

Perfect Squares:

$1^2=1$	$6^2=36$	$11^2=121$
$2^2=4$	$7^2=49$	$12^2=144$
$3^2=9$	$8^2=64$	$13^2=169$
$4^2=16$	$9^2=81$	$14^2=196$
$5^2=25$	$10^2=100$	$15^2=225$

To Simplify a Numerical Radicand:
1. Simplify if possible (fractions)
2. Find the <u>greatest</u> perfect square factor
3. Rewrite the radicand as the product of the factors
4. Find the square root and rewrite the answer

Simple Radicands

Simplify the radical expression in radical form (no decimal answers).

$\sqrt{48}$

$\sqrt{16 \cdot 3}$

$\sqrt{16} \cdot \sqrt{3}$

$4\sqrt{3}$

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48
1 | 48
2 | 24
3 | 16
4 | 12
6 | 8
```

$\sqrt{75}$

$\sqrt{25 \cdot 3}$

$\sqrt{25} \cdot \sqrt{3}$

$5\sqrt{3}$

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75
1 | 75
5 | 15
3 | 25
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$\sqrt{125}$

$\sqrt{25 \cdot 5}$

$\sqrt{25} \cdot \sqrt{5}$

$5\sqrt{5}$

$\sqrt{\frac{7}{16}} = \frac{\sqrt{7}}{\sqrt{16}} = \frac{\sqrt{7}}{4}$

$\sqrt{\frac{18}{3}} = \frac{6}{1}$

$\sqrt{6}$

$\sqrt{\frac{80}{45}} = \frac{16}{9}$

$\sqrt{\frac{80}{45}} = \sqrt{\frac{80}{45}}$

$\sqrt{\frac{16}{9}}$

$\frac{\sqrt{16}}{\sqrt{9}} = \frac{4}{3}$

$\sqrt{\frac{40}{90}} = \frac{4}{9}$

$\sqrt{\frac{4}{9}}$

$\frac{\sqrt{4}}{\sqrt{9}} = \frac{2}{3}$

$8 \cdot \frac{\sqrt{24}}{\sqrt{9}}$

$8 \cdot \frac{\sqrt{24}}{3}$

$8 \cdot \frac{\sqrt{4 \cdot 6}}{3}$

$8 \cdot \frac{\sqrt{4} \cdot \sqrt{6}}{3}$

$8 \cdot \frac{2 \cdot \sqrt{6}}{3}$

$\frac{16}{3}\sqrt{6} \qquad \frac{16\sqrt{6}}{3}$

Homework Assignment

Worksheet
"Simplifying Numerical Radicals"

Rationalize the Denominator

What You Need to Know:

Sometimes there are square roots in the denominator we just can't get rid of!

Identity Property: $\sqrt{a} * \sqrt{a} = a$

Multiply the denominator by itself and it gets rid of the square root!

If you multiply the bottom by a number, you have to multiply the ....

To Rationalize the Denominator:
1. Simplify if possible (fraction)
2. Separate using quotient property
3. Multiply both top and bottom by the square root in the denominator
4. Simplify if possible

Rationalize the denominator

Simplify the radical expression in radical form (no decimal answers). Rationalize the denominator if necessary.

$$\sqrt{\dfrac{4}{7}}$$

$$\sqrt{\dfrac{12}{30}}$$

$$\dfrac{1}{2}\sqrt{\dfrac{8}{50}}$$

$$\sqrt{\dfrac{2}{3}}\sqrt{\dfrac{5}{3}}$$

Homework Assignment

Worksheet
"Rationalize the Denominator"