Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

a) simplify a radical.

a) multiply, add and subtract radical expressions.

Last day's work:

pp. 160-162 #1 – 5, 7, 9, 13 [17]

3.4 Operations with Radicals

Date: Oct. 13/15

Recall: When working with radicals all answers must be in lowest terms.
Look for factors of the radicand that are perfect squares!

Ex.1: Simplify

Entire radical

a) $\sqrt{50}$

$= \sqrt{25}\sqrt{2}$

$= 5\sqrt{2}$

Mixed radical

b) $5\sqrt{45}$

$= 5\sqrt{9}\sqrt{5}$

$= 5(3)\sqrt{5}$

$= 15\sqrt{5}$

Ex.2: Compare

$4\sqrt{5}$ and $3\sqrt{10}$

$= \sqrt{4\times4\times5}$ $= \sqrt{9}\sqrt{10}$

$= \sqrt{16}\sqrt{5}$ $= \sqrt{90}$

$= \sqrt{80}$ $\therefore 4\sqrt{5} < 3\sqrt{10}$

Ex.3: Simplify

a) $\sqrt{6}\times\sqrt{3}$

$= \sqrt{18}$

$= \sqrt{9}\sqrt{2}$

$= 3\sqrt{2}$

b) $(-2\sqrt{7})(3\sqrt{7})$

$= -6\sqrt{7}\sqrt{7}$

$= -6\sqrt{49}$

$= -6(7)$

$= -42$

$\sqrt{6}\times\sqrt{3}$

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

Note: Many rules are similar to algebra:

Ex.4: Simplify

	radicals	algebra
a)	$\sqrt{2}+\sqrt{2}+\sqrt{2}$	$x+x+x$
	$=3\sqrt{2}$	$=3x$
b)	$2\sqrt{3}+5\sqrt{3}$	$2x+5x$
	$=7\sqrt{3}$	$=7x$
c)	$2\sqrt{3}+3\sqrt{7}$	$2x+3y$
	$=2\sqrt{3}+3\sqrt{7}$	$=2x+3y$

Summarizing some rules

$\sqrt{a}+\sqrt{a}$ $\quad$ $\sqrt{a}\times\sqrt{a}$

$=2\sqrt{a}$ $\quad$ $=a$

$\sqrt{\frac{a}{b}}$ $\quad$ $\sqrt{a}\times\sqrt{b}$

$=\frac{\sqrt{a}}{\sqrt{b}}$ $\quad$ $=\sqrt{ab}$

Ex.5: Simplify

a) $3(4-\sqrt{6})$

$=12-3\sqrt{6}$

b) $(2-3\sqrt{5})(6+\sqrt{5})$

$=12+2\sqrt{5}-18\sqrt{5}-3(5)$

$=12-16\sqrt{5}-15$

$=-3-16\sqrt{5}$

c) $\sqrt{\frac{2}{9}}$

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

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

d) $\sqrt{50}+\sqrt{27}-\sqrt{72}+2\sqrt{12}$

$=\sqrt{25}\sqrt{2}+\sqrt{9}\sqrt{3}-\sqrt{36}\sqrt{2}+2\sqrt{4}\sqrt{3}$

$=5\sqrt{2}+3\sqrt{3}-6\sqrt{2}+2(2)\sqrt{3}$

$=5\sqrt{2}+3\sqrt{3}-6\sqrt{2}+4\sqrt{3}$

$=-\sqrt{2}+7\sqrt{3}$

Note: The textbook gives answers with the denominator rationalized.
This means that there is not a radical sign in the denominator.
In order to accomplish this, just multiply by an equivalent of 1.

Ex.6: Simplify

a) $\frac{\sqrt{7}}{\sqrt{3}}$

$= \frac{\sqrt{7}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{\sqrt{21}}{3}$

You Try: Simplify

b) $\frac{2\sqrt{3}}{\sqrt{20}}$

$= \frac{2\sqrt{3}}{\sqrt{4}\sqrt{5}}$

$= \frac{2\sqrt{3}}{2\sqrt{5}}$

$= \frac{\sqrt{3}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$

$= \frac{\sqrt{15}}{5}$

c) $\frac{3\sqrt{2}}{2\sqrt{27}}$

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

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

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

$= \frac{\sqrt{6}}{2(3)}$

$= \frac{\sqrt{6}}{6}$

d) $\frac{\sqrt{6}}{2\sqrt{18}}$

$= \frac{\sqrt{6}}{2\sqrt{9}\sqrt{2}}$

$= \frac{\sqrt{6}}{2(3)\sqrt{2}}$

$= \frac{\sqrt{6}}{6\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{\sqrt{12}}{6(2)}$

$= \frac{\sqrt{4}\sqrt{3}}{12}$

$= \frac{2\sqrt{3}}{12}$

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

$\frac{\sqrt{6}}{2\sqrt{18}}$

$= \frac{\sqrt{6}}{2\sqrt{6}\sqrt{3}}$

$= \frac{1}{2\sqrt{3}}$

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 160-162 #1 – 5, 7, 9, 13 [17]

4 b c

Today's Homework Practice includes:

pp. 167-168 #(1 –7)ace, 8–10, 12 [15–17]