Today's Learning Goal(s):

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

a) convert an entire radical to a mixed radical in simplest form.

MPM 2DI 2.E Radicals Date: Sept. 28/16

Today we will convert an entire radical to a mixed radical in simplest form.

Copy-> A radical is any number with a root, or radical sign. $\sqrt{\ }$

Copy-> An **entire** radical has it's number entirely beneath the radical. Ex. $\sqrt{2}$

Copy-> A ***mixed*** radical has a coefficient in front of the radical. Ex. $4\sqrt{3}$

Radicals occur frequently when using the length formula, which we will begin using in the next class.

$\sqrt[2]{9} = 3$ $\sqrt[3]{8} = 2$

Observe:

$\sqrt{9} \times \sqrt{4}$
$= 3 \times 2$
$= 6$

Now:

$\sqrt{9} \times \sqrt{4}$
$= \sqrt{9 \times 4}$
$= \sqrt{36}$
$= 6$

Rule: $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$

$\sqrt{a} \times \sqrt{b}$
$= \sqrt{a \times b}$
$= \sqrt{ab}$

Note: $a, b \geq 0$

Next:

$\sqrt{4} \times \sqrt{3}$
$= 2 \times \sqrt{3}$
$= 2\sqrt{3}$

but

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

$\therefore 2\sqrt{3} = \sqrt{12}$ ← **entire** radical

mixed radical

An introductory video: (Click anywhere on the blue link below...play until the 5:36 mark)

Play until 5:36 http://www.khanacademy.org/math/arithmetic/exponents-radicals/radical-radicals/v/simplifying-radicals

Ex.1 Express as a mixed radical in simplest form.

a) $\sqrt{8}$

$= \sqrt{4}\sqrt{2}$

$= 2\sqrt{2}$

b) $\sqrt{12}$

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

$= 2\sqrt{3}$

c) $\sqrt{18}$

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

$= 3\sqrt{2}$

d$_1$) $\sqrt{32}$

$= \sqrt{4}\sqrt{8}$

$= 2\sqrt{8}$

$= 2\sqrt{4}\sqrt{2}$

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

$= 4\sqrt{2}$

d$_2$) $\sqrt{32}$

$= \sqrt{16}\sqrt{2}$

$= 4\sqrt{2}$

Now try with a partner:

e) $\sqrt{98}$

$= \sqrt{49}\sqrt{2}$

$= 7\sqrt{2}$

f) $\sqrt{150}$

$= \sqrt{25}\sqrt{6}$

$= 5\sqrt{6}$

g) $-3\sqrt{40}$

$= -3\sqrt{4}\sqrt{10}$

$= -3(2)\sqrt{10}$

$= -6\sqrt{10}$

Challenge Question:

h) $3\sqrt{5} \times 7\sqrt{10}$

$= 21\sqrt{50}$

$= 21\sqrt{25}\sqrt{2}$

$= 21(5)\sqrt{2}$

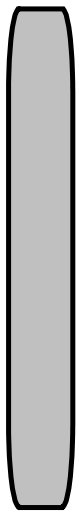
$= 105\sqrt{2}$

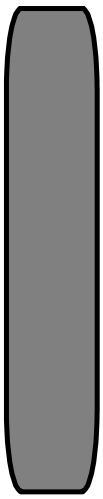
Reducing radicals is easier if you "memorize/recognize" the first 20 squares.

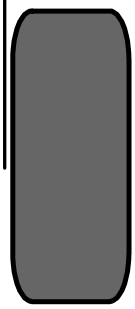
n	n^2
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64

n	n^2
9	81
10	100
11	121
12	144
13	169
14	196
15	225
16	256

n	n^2
17	289
18	324
19	361
20	400







Today's Worksheet#1 and 4

Note: Do NOT do #2 until next class!!

and Pythagorean Review p.327 #5, 6

Simplifying Radicals

1. Express each of these as mixed radicals in simplest form.
   a) $\sqrt{72}$
   b) $\sqrt{64}$
   c) $\sqrt{75}$
   d) $\sqrt{48}$
   e) $\sqrt{162}$
   f) $\sqrt{192}$

2. Find the length of the line segments with the given endpoints. Express your answers as simplified radicals.
   a) A(-2, 3) and B(4, 7)
   b) C(4, 8) and D(7, -4)
   c) E(-1, -6) and F(4, 4)
   d) G(-5, 2) and H(7, 8)

4. Express as a mixed radical in simplest form.
   a) $2\sqrt{125}$
   b) $5\sqrt{147}$
   c) $-6\sqrt{72}$
   d) $9\sqrt{24}$
   e) $-4\sqrt{50}$
   f) $0.5\sqrt{108}$

Solutions to Radicals Worksheet:

1, 4

Simplifying Radicals

1. Express each of these as mixed radicals in simplest form.

a) $\sqrt{72}$
b) $\sqrt{64}$
c) $\sqrt{75}$
d) $\sqrt{48}$
e) $\sqrt{162}$
f) $\sqrt{192}$

4. Express as a mixed radical in simplest form.

a) $2\sqrt{125}$
b) $5\sqrt{147}$
c) $-6\sqrt{72}$
d) $9\sqrt{24}$
e) $-4\sqrt{50}$
f) $0.5\sqrt{108}$

Simplifying Radicals Answers

1. a) $6\sqrt{2}$
b) 8
c) $5\sqrt{3}$
d) $4\sqrt{3}$
e) $9\sqrt{2}$
f) $8\sqrt{3}$

4. a) $10\sqrt{5}$
b) $35\sqrt{3}$
c) $-36\sqrt{2}$
d) $18\sqrt{6}$
e) $-20\sqrt{2}$
f) $3\sqrt{3}$