Lesson 2.5: Mixed and Entire Radicals

Specific Outcome: 2.5 – Express a radical as a mixed radical in simplest form (limited to numerical radicands). 2.6 – Express a mixed radical as an entire radical (limited to numerical radicands). 3.5 – Solve a problem that involves radicals.

ENTIRE RADICAL: The number is entirely under the radical sign in the form: $\sqrt[n]{b}$

MIXED RADICAL: A number written as a product of another number and a radical in the form: $a\sqrt[n]{b}$

SIMPLIFYING *ENTIRE TO MIXED*

1. ***Using Prime Factorization*** Simplify $\sqrt{80}$:

$\sqrt{80}$

Verify with a calculator:

Practice: Simplify each radical (convert to mixed form) by using prime factorization.

a) $\sqrt{63}$ b) $\sqrt{75}$ c) $\sqrt{128}$

*d) $2\sqrt{320}$ e) $\sqrt[3]{120}$ *e) $3\sqrt[3]{108}$

2. ***Using Perfect Square/Cube Roots***

Simplify $\sqrt{80}$:

NUMBER	SQUARE	CUBE
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125
6	36	216
7	49	343
8	64	512
9	81	729
10	100	1000
11	121	1331
12	144	1728
13	169	2197
14	196	2744
15	225	3375

Simplify $\sqrt[3]{80}$:

Practice: Simplify each of the following radicals by either finding a factor that is a perfect square/cube.

a) $\sqrt{54}$ b) $\sqrt{99}$ c) $3\sqrt{120}$ d) $-2\sqrt{72}$

e) $\sqrt[3]{40}$ f) $\sqrt[3]{54}$ g) $\sqrt[3]{128}$ h) $\sqrt[3]{250}$

HOMEWORK: P. 218 – 4, 9, 10-11(acegi), 21

CONVERTING *MIXED TO ENTIRE* RADICALS

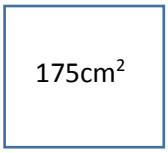
Convert $4\sqrt{3}$ to an entire radical:

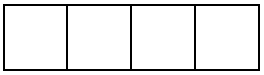
Practice: Write each mixed radical as an entire radical.

a) $7\sqrt{5}$ b) $2\sqrt{10}$ c) $9\sqrt{33}$ d) $3\sqrt[3]{6}$ *e) $-4\sqrt[3]{20}$ f) $\frac{1}{3}\sqrt[5]{4}$

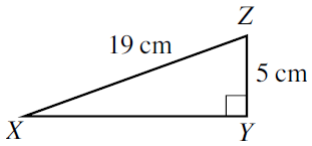
Problem Solving:

1. The side length of this square can be expressed as a radical in simplest form as $a\sqrt{b}$. The value of a is _____.

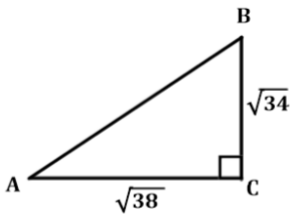




2. Use the Pythagorean formula $c^2 = a^2 + b^2$ to calculate the length of *XY* as:
   a) an entire radical
   b) a mixed radical



3. Determine the ***exact*** length of *BC* as:
   a) an entire radical
   b) a mixed radical



HOMEWORK: P. 218 – 12(acegi), 14-16, 20, 22a