Intro Applied & Pre-Calculus 10 Enriched Factors and Products

# Lesson 2 Mixed and Entire Radicals

**Multiplication Property of Radicals:** 

 $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b},$ 

.

ex 510 = 52.55

Where n is a natural number, and a and b are real numbers

**Mixed radicals** are those where the entire number is not under the radical symbol.

ex.  $3\sqrt{11}$ ,  $7\sqrt[3]{35}$ ,  $9\sqrt[4]{211}$ 

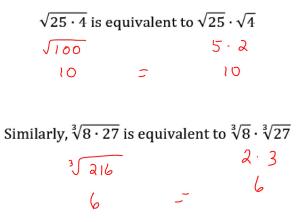
Entire radicals are those where the entire number is under the radical symbol.

ex.  $\sqrt{17}$ ,  $\sqrt[3]{32}$ ,  $\sqrt[4]{162}$ 

**Simple radicals** are those where the radicand doesn't have any square roots, cube roots, 4<sup>th</sup> roots, etc (dependent on the index) as factors.

**Complex radicals** are those where the radicand has a square root, cube root, 4<sup>th</sup> roots, etc factor (dependent on the index).

Radicals can be written in different forms in order to simplify complex radicals.



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## **Steps to Simplifying Radicals**

# Example 1 Simplify $\sqrt{18}$ continue radical 1. Determine the *largest* perfect square that will divide evenly into $5^2 = 45^2$ the radicand.

2. Write the number under the radical as a product of the perfect square and its corresponding number.

59.2

3. Separate each number with its own radical sign.

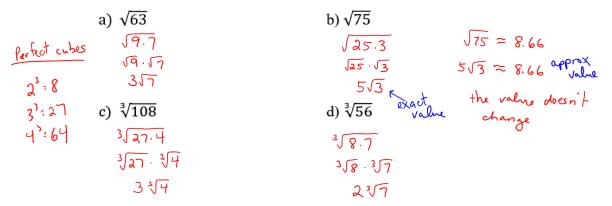
4. Simplify. 352 = simple radical mixed radical

### <u>Note:</u>

- If the radicand does not have a perfect square factor then it is already in simplest form.
- If you do not choose the *largest* perfect square, you will need to repeat the process.

#### **Example 2: Writing Radicals in Simplest Form**

Simplify each radical.



#### **Example 3 - Writing Mixed Radicals as Entire Radicals**

Write each mixed radical as an entire radical.

a) 7√3	c) 2∛4
$\sqrt{7^{2}\cdot 3}$	$\sqrt[3]{\lambda^3 \cdot 4}$
J49·3	3 8.4
$\sqrt{147}$	3/32

b) 2 √7	0 89
J2ª.7	PJ # 1c, e, 9, '
54.7	2 ~ 19
$\sqrt{28}$	3 c, g, i
	4 b, e, f, g
	5 b, d, h, j
	6 c, e, i

9 b,c,h 10 b,d,i