PRINCIPLES - LESSON 14B
ADDING & SUBTRACTING RADICALS

Recall: LIKE and UNLIKE terms

Examples of LIKE terms:

$5a$ & a

$3m^2$ & $-6m^2$

$-7x^2y^3$ & $-2x^2y^3$

Examples of UNLIKE terms:

$4a$ & $4b$

$2m^2$ & $3m$

$7x^2y^3$ & $2x^3y^2$

LIKE TERMS: terms that have exactly the same variables and exponents

We combine like terms simply adding (or subtracting) the coefficients of each like term and keeping the variables the same.

Unlike terms can NEVER be combined (added) but can be multiplied/divided.

LIKE RADICALS

LIKE RADICALS: radicals that have the same index and radicands

We can only combine LIKE radicals. Simply combine coefficients to add or subtract radicals. (the coefficients have to be like terms too)

Unlike radicals can NEVER be combined (added) but can be multiplied/divided.

Simplify.

ex1) $2x + 5y - 4x + 2y$

$= -2x + 7y$

ex2) $2\sqrt{3} + 5\sqrt{7} - 4\sqrt{3} + 2\sqrt{7}$

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

ADDING & SUBTRACTING RADICALS

Simplify.

Remember to simplify radicals!

ex3) $\sqrt{x} + \sqrt{x}$

$= \boxed{2\sqrt{x}}$

ex4) $\sqrt{75} - \sqrt{27}$

$= \sqrt{25 \cdot 3} - \sqrt{9 \cdot 3}$

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

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

ADDING & SUBTRACTING RADICALS

Simplify.

ex5) $3\sqrt{12} - \sqrt{48} + 2\sqrt{27}$

$= 3\sqrt{4 \cdot 3} - \sqrt{16 \cdot 3} + 2\sqrt{9 \cdot 3}$

$= \underline{6\sqrt{3}} \ \underline{- 4\sqrt{3}} \ \underline{+ 6\sqrt{3}}$

$= \boxed{8\sqrt{3}}$

ADDING & SUBTRACTING RADICALS

Simplify.

ex6) $-5\sqrt{4ab^2} + 3\sqrt{9ab^2}$

$= -5\sqrt{4ab^2} + 3\sqrt{9ab^2}$

$= -20b\sqrt{a} + 9b\sqrt{a}$

$= \boxed{-11b\sqrt{a}}$

ADDING & SUBTRACTING RADICALS

Simplify.

ex7) $(7\sqrt{5} - 2) - (-\sqrt{5} + 3) + (4 + 2\sqrt{5}) - 3\sqrt{3}$

$= 7\sqrt{5} - 2 + 1\sqrt{5} - 3 + 4 + 2\sqrt{5} - 3\sqrt{3}$

$= \boxed{7\sqrt{5} - 1}$

ADDING & SUBTRACTING RADICALS

Simplify.

ex8) $-2\sqrt[3]{128} + 5\sqrt{128} - 11\sqrt{32} + 9\sqrt[3]{16}$

$= -2\sqrt[3]{64 \cdot 2} + 5\sqrt{64 \cdot 2} - 11\sqrt{16 \cdot 2} + 9\sqrt[3]{8 \cdot 2}$

$= \underline{-8\sqrt[3]{2}} \; \underline{+ 40\sqrt{2}} \; \underline{- 44\sqrt{2}} \; \underline{+ 18\sqrt[3]{2}}$

$= \boxed{10\sqrt[3]{2} - 4\sqrt{2}}$