

7.3 - Adding and Subtracting Radical Expressions

①

→ Adding/Subtracting radical expressions is similar to adding & subtracting polynomials; you just combine like terms

like terms: $\sqrt{2}$ and $3\sqrt{2}$, $2\sqrt{4}$ and $-6\sqrt{4}$, $\sqrt[3]{2x^2}$ and $2\sqrt[3]{2x^2}$

Unlike terms: $\sqrt{3}$ and $\sqrt{4}$, $\sqrt[3]{6}$ and $\sqrt[4]{6}$, $\sqrt{2x}$ and $\sqrt{2}$

→ We can only combine like terms!

Ex a) $6\sqrt{5} - 2\sqrt{5} = (6-2)\sqrt{5} \rightarrow$ distributive property
 $= 4\sqrt{5}$

b) $3\sqrt[3]{3} + 6\sqrt[3]{3} = (3+6)\sqrt[3]{3}$
 $= 9\sqrt[3]{3}$

c) $9\sqrt[3]{17} + 7\sqrt[3]{2} - 4\sqrt[3]{17} + \sqrt[3]{2} = (9-4)\sqrt[3]{17} + (7+1)\sqrt[3]{2}$
 $= 5\sqrt[3]{17} + 8\sqrt[3]{2}$

d) $3\sqrt{x+1} + 10\sqrt{x+1} = (3+10)\sqrt{x+1} = 13\sqrt{x+1}$

sometimes we need to simplify first.

Ex a) $\sqrt{25y} + \sqrt{64y} = 5\sqrt{y} + 8\sqrt{y} = (5+8)\sqrt{y} = 13\sqrt{y}$

b) $4\sqrt{3x^3} - \sqrt{12x} = 4\sqrt{3 \cdot x^2 \cdot x} - \sqrt{4 \cdot 3 \cdot x} = 4x\sqrt{3x} - 2\sqrt{3x}$
 $= (4x-2)\sqrt{3x}$

c) $\sqrt{9x-9} - \sqrt{x^3-x^2} = \sqrt{9(x-1)} - \sqrt{x^2(x-1)}$
 $= 3\sqrt{x-1} - x\sqrt{x-1}$
 $= (3-x)\sqrt{x-1}$

d) $\sqrt{10} + \frac{5}{\sqrt{10}} = \sqrt{10} + \frac{5\sqrt{10}}{10} = \sqrt{10} + \frac{\sqrt{10}}{2} = (1+\frac{1}{2})\sqrt{10} = \frac{3}{2}\sqrt{10}$

Supplementary Problems:

1, 3, 5, 11, 15, 19, 21, 23, ~~27~~ 33, 39, 43, 47, 49, 51, 53