

2-2 Adding/Subt. Radicals

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2.2

Ma11

2.3 ADDING/SUBTRACTING RADICALS

Name: _____ Blk: _____

- Adding and subtracting radicals is similar to adding and subtracting polynomials

o Eg. $(2x - 3y + 4) + (-3x + y - 3)$

$$-x - 2y + 1$$

o Eg. $2(x + 2y - 2) - 3(x - y + 1)$

$$= 2x + 4y - 4 - 3x + 3y - 3$$

$$= -x + 7y - 7$$



- 'LIKE' radicals have the same radicand and the same index

o Eg. $2\sqrt{7}$ and $3\sqrt{7}$ are 'LIKE'

o Eg. $5\sqrt{2}$ and $5\sqrt{3}$ are not like

o Eg. $8\sqrt[3]{3}$ and $2\sqrt[3]{3}$ are 'LIKE'

o Eg. $7\sqrt[4]{5}$ and $4\sqrt{5}$ are not like

★ You may have to simplify radicals (change to mixed) to add and subtract them

1. Simplify:

a. $9\sqrt{5} - 5\sqrt{5}$
 $= 4\sqrt{5}$

b. $\sqrt[3]{24} - \sqrt[3]{192} - \sqrt[3]{375}$ ① simplify
 $= 2\sqrt[3]{3} - 4\sqrt[3]{3} - 5\sqrt[3]{3}$

$$\begin{aligned}
 & \text{b. } \sqrt[3]{24} - \sqrt[3]{192} - \sqrt[3]{375} \\
 &= 2\sqrt[3]{3} - 4\sqrt[3]{3} - 5\sqrt[3]{3} \\
 &= \boxed{-7\sqrt[3]{3}}
 \end{aligned}$$

$$\begin{aligned}
 & \text{c. } \sqrt{63} + \sqrt{40} - \sqrt{90} - \sqrt{28} \quad \text{you try.} \\
 &= 3\sqrt{7} + 2\sqrt{10} - 3\sqrt{10} - 2\sqrt{7} \\
 &= \boxed{\sqrt{7} - \sqrt{10}}
 \end{aligned}$$

$$\text{d. } 6\sqrt{a} + 5\sqrt{a} - 11\sqrt{a}, a \geq 0 \quad \textcircled{1} \text{ Define your variable / state your restriction.}$$

0

$$\begin{aligned} \text{e. } & \sqrt{50a^2b} - \sqrt{8a^2b}, \quad a \in \mathbb{R}, b \geq 0 \\ & = 5|a|\sqrt{2b} - 2|a|\sqrt{2b} \\ & = 3|a|\sqrt{2b} \end{aligned}$$

$$\begin{aligned} \text{f. } & \sqrt[3]{27p^3q} + 8\sqrt[3]{p^3q}, \quad p, q \in \mathbb{R} \quad (p \in \mathbb{R}, q \in \mathbb{R}) \\ & = 3p\sqrt[3]{q} + 8p\sqrt[3]{q} \\ & = 11p\sqrt[3]{q} \end{aligned}$$

you try
↓
g. $7\sqrt{m} + 2\sqrt{n} + 5\sqrt{n} - 3\sqrt{m}, \quad m, n \geq 0$

$$= \boxed{4\sqrt{m} + 7\sqrt{n}}$$

$$\begin{aligned} \text{h. } & 2\sqrt[3]{-3b} + 8\sqrt[3]{-3b} - 9\sqrt[3]{-3b} + 3\sqrt[3]{-3b}, \quad b \leq 0 \\ & = -7\sqrt[3]{-3b} + 11\sqrt[3]{-3b} \end{aligned}$$

$$\begin{aligned} \text{i. } & \sqrt[4]{81p^3q^5} - 2\sqrt[4]{p^3q^5}, \quad p, q \geq 0 \text{ or } p, q < 0 \\ & = 3|q|^4\sqrt[4]{p^3q} - 2|q|^4\sqrt[4]{p^3q} \\ & = \boxed{|q|^4\sqrt[4]{p^3q}} \end{aligned}$$

$$\begin{aligned} \text{j. } & \sqrt{25a^2b} + \sqrt{4a^2b}, \quad a \in \mathbb{R}, b \geq 0 \\ & = 5|a|\sqrt{b} + 2|a|\sqrt{b} \\ & = \boxed{7|a|\sqrt{b}} \end{aligned}$$

$$\begin{aligned} \text{k. } & 3\sqrt{32a^5} - 2\sqrt{45b^3} + 5b\sqrt{125b} - 2a\sqrt{72a^3}, \quad a, b \geq 0 \\ & = 12a^2\sqrt{2a} - 6b\sqrt{5b} + 25b\sqrt{5b} - 12a^2\sqrt{2a} \\ & = \boxed{19b\sqrt{5b}} \end{aligned}$$

Assignment:
WB: p-106 # 4ab, 5ac, 7, 8bd, 10, 12

Ch. 2 Quiz Next week