# Day 8 – Adding and Subtracting Radicals – Notes

To add and subtract radicals, you have to use the same concept of combining "like terms", in other words, your radicands must be the same before you can add or subtract.

**Explore:** Simplify the following expressions:

a. $4x + 6x$

$10x$

b. $5x^2 - 2x^2$

$3x^2$

c. $8x^2 + 3x - 4x^2$

$4x^2 + 3x$

## Adding/Subtracting Radicals – RULE

1. Simplify all radicals
2. Then add/subtract the like radicals

**Practice:**

a. $2\sqrt{5} + 6\sqrt{5}$

$8\sqrt{5}$

b. $3\sqrt{7} + 2\sqrt{7}$

$5\sqrt{7}$

c. $4\sqrt{15} - 6\sqrt{15}$

$-2\sqrt{15}$

d. $6\sqrt{7} + 8\sqrt{10} - 3\sqrt{7}$

$3\sqrt{7} + 8\sqrt{10}$

e. $11\sqrt{5} - 2\sqrt{20}$

$11\sqrt{5} - 2\sqrt{4 \cdot 5}$

$11\sqrt{5} - 2 \cdot 2\sqrt{5}$

$11\sqrt{5} - 4\sqrt{5}$

$7\sqrt{5}$

f. $3\sqrt{3} + 6\sqrt{27}$

$3\sqrt{3} + 6\sqrt{3 \cdot 3 \cdot 3}$

$3\sqrt{3} + 6 \cdot 3\sqrt{3}$

$3\sqrt{3} + 18\sqrt{3}$

$21\sqrt{3}$

g. $3\sqrt{5}+2\sqrt{500}$

$3\sqrt{5}+2\sqrt{10\cdot10\cdot5}$

$3\sqrt{5}+2\cdot10\sqrt{5}$

$3\sqrt{5}+20\sqrt{5}$

$23\sqrt{5}$

h. $3\sqrt{3}-2\sqrt{12}$

$3\sqrt{3}-2\sqrt{2\cdot2\cdot3}$

$3\sqrt{3}-2\cdot2\sqrt{3}$

$3\sqrt{3}-4\sqrt{3}$

$-\sqrt{3}$

i. $12\sqrt{50}+6\sqrt{2}$

$12\sqrt{2\cdot5\cdot5}+6\sqrt{2}$

$12\cdot5\sqrt{2}+6\sqrt{2}$

$60\sqrt{2}+6\sqrt{2}$

$66\sqrt{2}$

## Putting It All Together: Put together everything you have learned from Days 1 – 3:

a. $\sqrt{12}(\sqrt{9}-\sqrt{4})$

$\sqrt{12}(3-2)$

$\sqrt{12}(1)$

$\sqrt{12}$

$\sqrt{2\cdot2\cdot3}$

$2\sqrt{3}$

b. $\sqrt{3}\left(\sqrt{3}+2\sqrt{5}\right)$

$\sqrt{9}+2\sqrt{15}$

$3+2\sqrt{15}$

c. $\sqrt{5}(\sqrt{10}-\sqrt{15})$

$\sqrt{50}-\sqrt{75}$

$\sqrt{2\cdot5\cdot5}-\sqrt{3\cdot5\cdot5}$

$5\sqrt{2}-5\sqrt{3}$

d. $-\sqrt{5}\left(\sqrt{10}+3\right)$

$-\sqrt{50}-3\sqrt{5}$

$-\sqrt{2\cdot5\cdot5}-3\sqrt{5}$

$-5\sqrt{2}-3\sqrt{5}$

e. $5\sqrt{6}\left(\sqrt{6}+4\sqrt{5}\right)$

$5\sqrt{36}+20\sqrt{30}$

$5\cdot6+20\sqrt{30}$

$30+20\sqrt{30}$

f. $-3\sqrt{3}\left(4\sqrt{6}-2\sqrt{2}\right)$

$-12\sqrt{18}+6\sqrt{6}$

$-12\sqrt{2\cdot3\cdot3}+6\sqrt{6}$

$-12\cdot3\sqrt{2}+6\sqrt{6}$

$-36\sqrt{2}+6\sqrt{6}$