



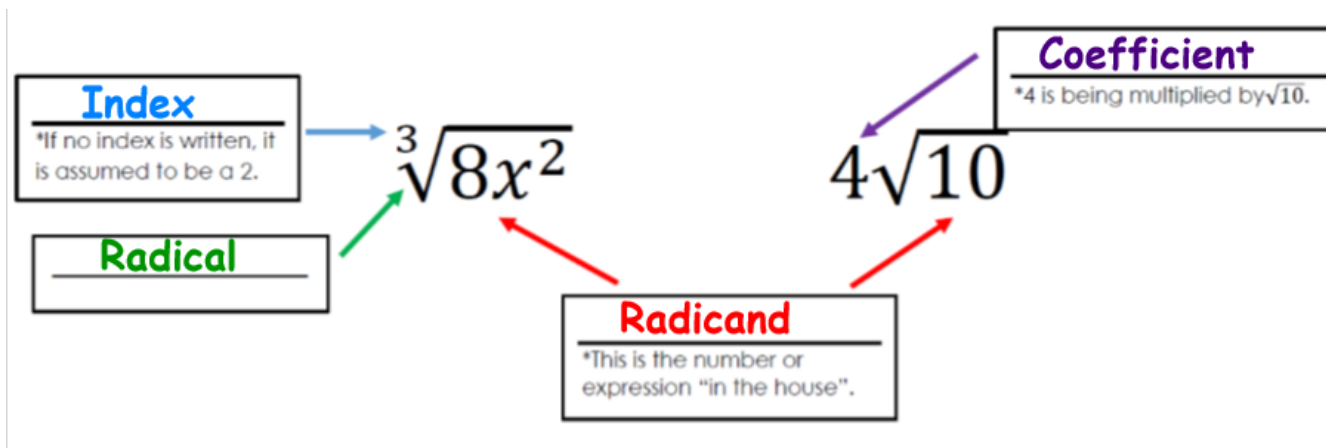
## Essential Question 1/19/2021

- How can I multiply, add, and subtract Radical Expressions?

### Unit 1

## Day 6 - Adding, Subtracting, and Multiplying Radical Expressions

## Review Vocabulary



# Multiplying Radicals

Standard(s): Standard(s): MGSE9–12.N.RN.2

Rewrite expressions involving radicals and rational exponents using the properties of exponents

When multiplying radicals, follow the following rules:

**Multiplying Radicals - RULE**

1. Multiply the Outside together.
2. Multiply the Inside together.
3. Simplify the radical.

Directions: Multiply the following radicals. Make sure they are in simplest form.

a.  $\sqrt{2} \cdot \sqrt{18}$

$$\sqrt{36}$$

$$\sqrt{6}$$

b.  $\sqrt{5} \cdot \sqrt{10}$

$$\sqrt{50}$$

$$\sqrt{25 \cdot 2}$$

$$5\sqrt{2}$$

c.  $-\sqrt{6} \cdot 3\sqrt{8}$

$$= -3\sqrt{48}$$

$$= -3\sqrt{16 \cdot 3}$$

$$= -12\sqrt{3}$$

## Multiplying Radicals with Variables

**Recall- Law of Exponents:** When multiplying expressions with the same bases, add the exponents.

1.  $x^2 \cdot x^5 = x^7$

2.  $a^3 \cdot a^4 = a^7$

3.  $y^2 \cdot y^5 \cdot z^2 = y^7 z^2$

Directions: Multiply the following radicals. Make sure they are in simplest form.

a.  $\sqrt{3x} \cdot \sqrt{15x}$

$$\sqrt{45x^2}$$

$$\sqrt{9 \cdot 5 x^2}$$

$\downarrow$       $\downarrow$   
3     x

$3x\sqrt{5}$

b.  $-4\sqrt{10x^3} \cdot -4\sqrt{6x}$

$$16\sqrt{60x^4}$$

$$16\sqrt{4 \cdot 15 \cdot x^4}$$

$\downarrow$       $\downarrow$       $\downarrow$   
2     x<sup>2</sup>

$32x^2\sqrt{15}$

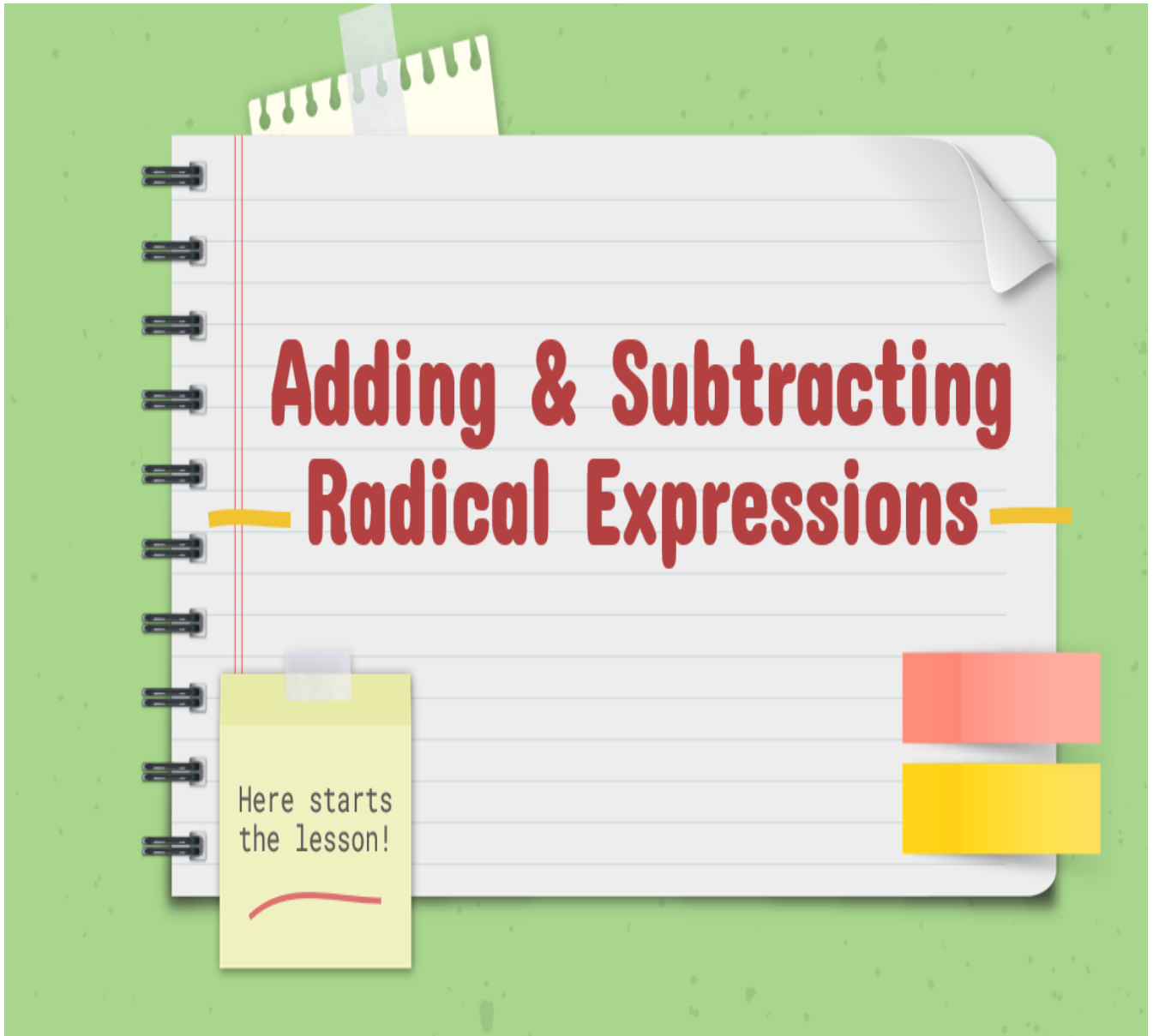
c.  $-3\sqrt{8x^4z} \cdot -7\sqrt{y^3z^5}$

$$21\sqrt{8x^4y^3z^6}$$

$$21\sqrt{4 \cdot 2x^4y^3z^4}$$

$\downarrow$       $\downarrow$       $\downarrow$       $\downarrow$   
2     x<sup>2</sup>     y     z<sup>3</sup>

$42x^2yz^3\sqrt{2y}$



## Adding & Subtracting Radicals

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 - I do

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

$8\sqrt{5}$

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

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



## Putting it Altogether - I do

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

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

$$\sqrt{25 \cdot 2} - \sqrt{25 \cdot 3}$$

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

b.  $-\sqrt{5}(\sqrt{10} + 3)$

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

$$-\sqrt{25 \cdot 2} - 3\sqrt{5}$$

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