

## Add & Subtract

1. Simplify all the square roots
2. If the square roots  $\sqrt{\#}$  (radicand) are exactly the same add the coefficients.

Ex 4       $3\sqrt{6} + 8\sqrt{6}$   
     $11\sqrt{6}$

Ex 5       $2\sqrt{7} + 9\sqrt{3} - 8\sqrt{7}$   
     $-6\sqrt{7} + 9\sqrt{3}$

Ex 6       $5\sqrt{3} - \sqrt{27}$        $\sqrt{3 \cdot 3 \cdot 3}$   
     $\sqrt{9 \cdot 3}$        $\sqrt{9} \cdot \sqrt{3}$   
     $3 \cdot 3$        $3\sqrt{3}$

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

Foundations of Algebra

Unit 1 – Number Sense and Quantity

Notes

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Day 9 – Adding and 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 – RULES**

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

$11\sqrt{5} - 4\sqrt{5}$   
 $7\sqrt{5}$

$\sqrt{20} = \sqrt{4 \cdot 5}$   
 $2\sqrt{5}$

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

$3\sqrt{3} + 18\sqrt{3}$   
 $21\sqrt{3}$

$6\sqrt{27}$   
 $6 \cdot \sqrt{9 \cdot 3}$   
 $6 \cdot 3\sqrt{3}$

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

$23\sqrt{5}$

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

$-1\sqrt{3}$   
 $-\sqrt{3}$

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

$66\sqrt{2}$

$6\sqrt{27}$   
 $6 \cdot \sqrt{9 \cdot 3}$   
 $6 \cdot 3\sqrt{3}$

## Multiply

1. Multiply the coefficients
2. Multiply the square roots
3. Simplify

Ex 7      $\sqrt{5} \cdot \sqrt{20}$

$$\sqrt{100}$$

$$10$$

Ex 8      $7\sqrt{8} \cdot 7\sqrt{8}$

$$7\sqrt{64}$$

$$7 \cdot 8$$

$$56$$

Ex 9      $7\sqrt{2} \cdot 3\sqrt{18}$

$$21\sqrt{36}$$

$$21 \cdot 6$$

$$126$$

**Practice:** Simplify.

1)  $\sqrt{45}$

2)  $-\sqrt{98}$

3)  $\sqrt{48}$

4)  $2\sqrt{45}$

5)  $\sqrt{20}$

6)  $4\sqrt{40}$

**Multiplying Radicals**

The \_\_\_\_\_ of \_\_\_\_\_ states the square root of a product equals the product of the square roots of the factors.

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b} \text{ where } a \geq 0 \text{ and } b \geq 0$$

When multiplying radicals, follow the following rules:

**Multiplying Radicals – RULES**

1. Multiply the coefficient together.
2. Multiply the Radical together.
3. Simplify the radical.

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

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

$$\sqrt{36}$$

$$6$$

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

$$\sqrt{50}$$

$$5\sqrt{2}$$

c.  $\sqrt{8} \cdot \sqrt{32}$

$$\sqrt{256}$$

$$16$$

d.  $4\sqrt{6} \cdot 4\sqrt{6}$

$$16\sqrt{36}$$

$$16 \cdot 6$$


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$$96$$

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

$$-3\sqrt{48}$$

$$16 \sqrt{3}$$


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$$-12\sqrt{3}$$

f.  $6\sqrt{15} \cdot \sqrt{10}$

$$6\sqrt{150}$$

$$6 \cdot 5\sqrt{6}$$


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$$30\sqrt{6}$$

$$\sqrt{25} \cdot \sqrt{6}$$

$$5\sqrt{6}$$