

# 11-2 Adding and Subtracting Radicals

When performing operations on radicals, we can follow some of the same guidelines as when we perform operations on like and unlike terms. As you know, we are **NOT** able to add and subtract unlike terms. Consider the unlike terms  $8x^6$  and  $2x^2$ .

$$8x^6 + 2x^2 = 8x^6 + 2x^2 \quad 8x^6 - 2x^2 = 8x^6 - 2x^2$$

For radical expressions, **like radicals** have the same radicand. **Unlike radicals** do not have the same radicand. Examine the similarities between the two examples below:

$$3x - 5y + 6x + 8y = 9x + 3y$$

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

**\*\*You may need to simplify a radical expression to determine if you have like radicals.\*\***

## Guided Practice:

1.  $3\sqrt{20} + 2\sqrt{5} =$   
 $3 \sqrt{4} \sqrt{5}$

$3 \cdot 2 \sqrt{5}$

$6\sqrt{5} + 2\sqrt{5} = 8\sqrt{5}$

3.  $\sqrt{32} - 4\sqrt{8} =$

$\sqrt{16} \sqrt{2} - 4 \sqrt{4} \sqrt{2}$

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

$-8\sqrt{2}$

$-4\sqrt{2}$

2.  $5\sqrt{27} - 6\sqrt{3} =$

$5\sqrt{9} \sqrt{3}$

$5 \cdot 3\sqrt{3}$

$15\sqrt{3} - 6\sqrt{3} = 9\sqrt{3}$

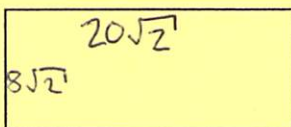
4.  $\sqrt{5a^2} + \sqrt{80a^2} =$

$a\sqrt{5} + \sqrt{16} \sqrt{5} \sqrt{a^2}$

$4a\sqrt{5}$

$5a\sqrt{5}$

5. Find the perimeter of the rectangle below:



$4\sqrt{50}$   
 $4\sqrt{25} \sqrt{2}$

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

$\sqrt{128}$   
 $\sqrt{64} \sqrt{2}$   
 $8\sqrt{2}$

$P = 20\sqrt{2} + 8\sqrt{2} + 20\sqrt{2} + 8\sqrt{2}$

$P = 56\sqrt{2}$

1  
4  
9  
16  
25  
36  
49  
64  
81  
100

Expressed in simplest radical form, the sum of  $5\sqrt{7}$  and  $3\sqrt{28}$ ?

(1)  $9\sqrt{7}$

(2)  $11\sqrt{7}$

(3)  $60\sqrt{7}$

(4)  $8\sqrt{35}$

**Simplify the following expressions.**

2.  $3\sqrt{5} + 6\sqrt{2} - 3\sqrt{2} + \sqrt{5} =$

3.  $6a\sqrt{50} - 6a\sqrt{2} =$

4.  $\sqrt{27} - \sqrt{75} =$

5.  $5\sqrt{12} - 3\sqrt{18} + \sqrt{3} =$

6.  $\frac{16\sqrt{21}}{2\sqrt{7}} - 5\sqrt{12} =$