

Essential Question: How do you add and subtract radicals?

If terms have the same radicand, then they can be simplified by addition or subtraction of their

Example Simplify.

a. $4\sqrt{2} - \sqrt{2}$

b. $\sqrt{12} + \sqrt{27}$

c. $5\sqrt{7} - 3\sqrt{2} + \sqrt{7}$

d. $4\sqrt{18} + 6\sqrt{12} - 7\sqrt{32}$

e. $5\sqrt{6} - 3\sqrt{24} + 2\sqrt{54}$

f. $4\sqrt{27} + \sqrt{12} - 7\sqrt{75}$

g. $5\sqrt{20} - 3\sqrt{5} - 4\sqrt{24}$

h. $4\sqrt{44} + 6\sqrt{11} - 7\sqrt{99}$

i. $-\sqrt{28} - \sqrt{28} - 7\sqrt{7}$

j. $4\sqrt{32} + 6\sqrt{40} - \sqrt{40}$

Adding and Subtracting Radicals

Simplify.

1) $2\sqrt{2} - 2\sqrt{2}$

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

3) $3\sqrt{6} - 3\sqrt{6}$

4) $-2\sqrt{3} + 3\sqrt{3}$

5) $3\sqrt{6} - 2\sqrt{6}$

6) $-3\sqrt{54} - \sqrt{24}$

7) $-\sqrt{8} + 2\sqrt{8}$

8) $-2\sqrt{12} - \sqrt{3}$

9) $3\sqrt{18} + 2\sqrt{18}$

10) $-3\sqrt{8} - 3\sqrt{8}$

11) $-\sqrt{2} - \sqrt{54} - 3\sqrt{2}$

12) $-\sqrt{12} - 3\sqrt{18} - 2\sqrt{12}$

13) $-\sqrt{27} - \sqrt{27} - 3\sqrt{3}$

14) $-3\sqrt{2} + 3\sqrt{5} + 3\sqrt{2}$

Geometry Notes: Adding and Subtracting Radicals

Key

Date: Aug 25, 2015 (Tues)

Essential Question: How do you add and subtract radicals?

Terms have the same radicand, then they can be simplified by addition or subtraction of their like terms.
 * Add and subtract outside with outside (only if insides are matching)
 * Inside "like terms" remain unchanged

Example Simplify.

a. $4\sqrt{2} - \sqrt{2} = \boxed{3\sqrt{2}}$

b. $\sqrt{12} + \sqrt{27} = \sqrt{4 \cdot 3} + \sqrt{9 \cdot 3}$
 $2\sqrt{3} + 3\sqrt{3} = \boxed{5\sqrt{3}}$

c. $5\sqrt{7} - 3\sqrt{2} + \sqrt{7}$

$\boxed{6\sqrt{7} - 3\sqrt{2}}$

d. $4\sqrt{18} + 6\sqrt{12} - 7\sqrt{32}$

$4\sqrt{9 \cdot 2} + 6\sqrt{4 \cdot 3} - 7\sqrt{16 \cdot 2}$
 $4 \cdot 3\sqrt{2} + 6\sqrt{3} - 7 \cdot 4\sqrt{2}$
 $12\sqrt{2} + 12\sqrt{3} - 28\sqrt{2}$
 $\boxed{-16\sqrt{2} + 12\sqrt{3}}$

e. $5\sqrt{6} - 3\sqrt{24} + 2\sqrt{54}$

$5\sqrt{6} - 3\sqrt{6 \cdot 4} + 2\sqrt{9 \cdot 6}$

$5\sqrt{6} - 3 \cdot 2\sqrt{6} + 6\sqrt{6}$

$\boxed{5\sqrt{6}}$

f. $4\sqrt{27} + \sqrt{12} - 7\sqrt{75}$

$4\sqrt{9 \cdot 3} + \sqrt{4 \cdot 3} - 7\sqrt{25 \cdot 3}$

$4 \cdot 3\sqrt{3} + 2\sqrt{3} - 7 \cdot 5\sqrt{3}$

$12\sqrt{3} + 2\sqrt{3} - 35\sqrt{3}$

~~$-11\sqrt{3}$~~

$\boxed{-21\sqrt{3}}$

g. $5\sqrt{20} - 3\sqrt{5} - 4\sqrt{24}$

$5\sqrt{4 \cdot 5} - 3\sqrt{5} - 4\sqrt{4 \cdot 6}$

$10\sqrt{5} - 3\sqrt{5} - 8\sqrt{6}$

$\boxed{7\sqrt{5} - 8\sqrt{6}}$

h. $4\sqrt{44} + 6\sqrt{11} - 7\sqrt{99}$

$4\sqrt{4 \cdot 11} + 6\sqrt{11} - 7\sqrt{9 \cdot 11}$

$8\sqrt{11} + 6\sqrt{11} - 21\sqrt{11}$

$\boxed{-7\sqrt{11}}$

i. $-\sqrt{28} - \sqrt{28} - 7\sqrt{7}$

$-2\sqrt{28} - 7\sqrt{7}$

$-2\sqrt{4 \cdot 7}$

$-4\sqrt{7} - 7\sqrt{7} = \boxed{-11\sqrt{7}}$

j. $4\sqrt{32} + 6\sqrt{40} - \sqrt{40}$

$4\sqrt{32} + 5\sqrt{40}$

$4\sqrt{16 \cdot 2} + 5\sqrt{4 \cdot 10}$

$\boxed{16\sqrt{2} + 10\sqrt{10}}$

Key

Geometry

Name _____

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Adding and Subtracting Radicals

* Add/subtract outside with outside
* Inside "like terms" remain unchanged

Simplify.

1) $2\sqrt{2} - 2\sqrt{2}$

0

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

$1\sqrt{6}$

3) $3\sqrt{6} - 3\sqrt{6}$

0

4) $-2\sqrt{3} + 3\sqrt{3}$

$1\sqrt{3}$

5) $3\sqrt{6} - 2\sqrt{6}$

$1\sqrt{6}$

$-3\sqrt{9 \cdot 6} - \sqrt{4 \cdot 6}$
6) $-3\sqrt{54} - \sqrt{24} =$
 $-11\sqrt{6}$

$-9\sqrt{6} - 2\sqrt{6}$
 $= -11\sqrt{6}$

7) $-\sqrt{8} + 2\sqrt{8}$

$2\sqrt{2}$

$+\sqrt{8} = \sqrt{2 \cdot 4}$
 $= 2\sqrt{2}$

8) $-2\sqrt{12} - \sqrt{3}$

$-5\sqrt{3}$

$-2\sqrt{4 \cdot 3} - \sqrt{3}$

$-4\sqrt{3} - 1\sqrt{3} = -5\sqrt{3}$

9) $3\sqrt{18} + 2\sqrt{18}$

$15\sqrt{2}$

$5\sqrt{18}$
 $5 \cdot \sqrt{9 \cdot 2}$
 $15\sqrt{2}$

10) $-3\sqrt{8} - 3\sqrt{8}$

$-12\sqrt{2}$

$= -6\sqrt{8}$

$= -6\sqrt{4 \cdot 2}$

$-12\sqrt{2}$

11) $-\sqrt{2} - \sqrt{54} - 3\sqrt{2}$

$-4\sqrt{2} - 3\sqrt{6}$

$-\sqrt{2} - \sqrt{9 \cdot 6} - 3\sqrt{2}$
 $-4\sqrt{2} - 3\sqrt{6}$

12) $-\sqrt{12} - 3\sqrt{18} - 2\sqrt{12}$

$-6\sqrt{3} - 9\sqrt{2}$

$-\sqrt{4 \cdot 3} - 3\sqrt{9 \cdot 2} - 2\sqrt{4 \cdot 3}$
 $-2\sqrt{3} - 9\sqrt{2} - 4\sqrt{3}$
 $= -6\sqrt{3} - 9\sqrt{2}$

13) $-\sqrt{27} - \sqrt{27} - 3\sqrt{3}$

$-9\sqrt{3}$

$-2\sqrt{27} - 3\sqrt{3}$
 $-2\sqrt{9 \cdot 3} - 3\sqrt{3}$

14) $3\sqrt{2} + 3\sqrt{5} + 3\sqrt{2}$

$6\sqrt{2} + 3\sqrt{5}$

$0 + 3\sqrt{5}$
 $= 3\sqrt{5}$

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