

LESSON
6Adding and Subtracting
Square Roots

Review It!

If square roots are the same, you can add and subtract them.

Add: $11\sqrt{7} + 13\sqrt{28}$

Step 1 Simplify each square root.

$11\sqrt{7}$ cannot be simplified.

$$13\sqrt{28} = 13 \times \sqrt{\square \times 7}$$

$$= 13 \times \sqrt{\square} \times \sqrt{7}$$

$$= 13 \times \underline{\quad} \times \sqrt{7}$$

$$= 26\sqrt{7}$$

REMEMBER Look for perfect-square factors.

THINK This is a perfect-square factor.

Step 2 Add the square roots.

$$11\sqrt{7} + 26\sqrt{7} = (\underline{\quad} + \underline{\quad})\sqrt{7}$$

$$= \underline{\quad}\sqrt{7}$$

THINK The square roots are the same.

So, $11\sqrt{7} + 13\sqrt{28} = \underline{\quad}$.

Try It!

Simplify each expression.

1. $3\sqrt{12}$ 2. $5\sqrt{18}$ 3. $7\sqrt{50}$ 4. $6\sqrt{20}$

5. $-2\sqrt{32}$ 6. $-6\sqrt{27}$ 7. $-9\sqrt{40}$ 8. $-3\sqrt{45}$

Add or subtract.

9. $12\sqrt{7} - 4\sqrt{7}$ 10. $11\sqrt{2} + 11\sqrt{2}$

11. $6\sqrt{2} + 3\sqrt{8}$ 12. $7\sqrt{3} - 2\sqrt{27}$

13. $12\sqrt{18} - 3\sqrt{8}$ 14. $8\sqrt{45} + 4\sqrt{20}$

Solve.

15. The distance from home plate to second base is $30\sqrt{18}$ in a Baby Ruth league and $15\sqrt{50}$ in a pony league. What is the difference in the distances?
- _____

16. The distance from first base to third base is $10\sqrt{162}$ feet in a baseball field and $15\sqrt{32}$ feet in a Little League field. What is the difference in the distances?
- _____

Ask Yourself

1.

What is the greatest perfect-square factor of 12?
4, or 6?

9.

12 apples - 4 apples = ?
8 apples, or 8?

15.

What is the greatest perfect-square factor of 162?
9, or 81?

On Your Own!

Circle the best answer for each question.

1. $6\sqrt{5} + 8\sqrt{5} =$ _____
 A. $14\sqrt{5}$
 B. $14\sqrt{10}$
 C. $48\sqrt{5}$
 D. $48\sqrt{10}$
2. $11\sqrt{3} - 4\sqrt{3} =$ _____
 A. $15\sqrt{6}$
 B. $15\sqrt{3}$
 C. $7\sqrt{6}$
 D. $7\sqrt{3}$
3. $24\sqrt{6} + 21\sqrt{6} =$ _____
 A. 270
 B. $90\sqrt{3}$
 C. $45\sqrt{12}$
 D. $45\sqrt{6}$
4. $9\sqrt{48} + 3\sqrt{12} =$ _____
 A. $42\sqrt{3}$
 B. $12\sqrt{60}$
 C. $48\sqrt{5}$
 D. $78\sqrt{3}$
5. $5\sqrt{40} - 2\sqrt{90} =$ _____
 A. $-4\sqrt{10}$
 B. $4\sqrt{10}$
 C. $3\sqrt{50}$
 D. $3\sqrt{70}$
6. $11\sqrt{32} + 8\sqrt{50} =$ _____
 A. $84\sqrt{2}$
 B. $19\sqrt{82}$
 C. $128\sqrt{2}$
 D. $88\sqrt{82}$
7. Ben cut a 9-foot by 12-foot rug between opposite corners. Each cut side is $\sqrt{180}$ feet. How many feet of binding are needed for both cut sides?
 A. $18\sqrt{10}$ C. $12\sqrt{5}$
 B. $6\sqrt{10}$ D. $2\sqrt{70}$
8. The distance between first and third base is $25\sqrt{18}$ feet in one field and $10\sqrt{72}$ feet in another field. What is the difference in distances?
 A. $45\sqrt{6}$ C. $15\sqrt{3}$
 B. $45\sqrt{2}$ D. $15\sqrt{2}$

9. Simplify the following expression.

$$11\sqrt{45} + 12\sqrt{20} - 7\sqrt{80}$$

10. Simplify the following expression.

$$4\sqrt{18} + 5\sqrt{8} - 3\sqrt{50}$$

Math Words

Fill in the blanks.

11. To add and subtract square roots, they must be the _____.
12. To simplify a square root, look for the greatest _____ factor.