**Squares and Square Roots**

A **perfect square** has two identical integer factors.

**For example:** 25 = 5 • 5 = 52 **or**25 = (−5)(−5) = (−5)2

Since 52 = 25 and (−5)2 = 25, both 5 and −5 (can be written as ±5) are the **square roots** of 25.

Identify the square roots of the following perfect squares:

1. The square roots of 16 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
2. The square roots of 81 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
3. The square roots of 4 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
4. The square roots of 169 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
5. The square roots of 36 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
6. The square roots of 9 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
7. The square roots of 1 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
8. The square roots of 225 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
9. The square roots of 144 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
10. The square roots of 49 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
11. The square roots of 100 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
12. The square roots of 196 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
13. The square roots of 25 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
14. The square roots of 64 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_
15. The square roots of 121 are \_\_\_\_ and \_\_\_\_ because ( )2 and ( )2 = \_\_\_\_\_

When you press the  key on a calculator, only the positive square root appears.

This is called the ***principal square root*** of the number.

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Use the principal square root when evaluating an expression.

**Simplify each expression**

**1.** $\sqrt{49}$ + 10 **2.** 30 − $\sqrt{16}$ **3.** $\sqrt{150-29}$ **4.** $\frac{\sqrt{225}}{5}$ **5.** 3$\sqrt{196}$

**Square roots are commonly used in different professions. Here are some examples:**

 ***Home decorating:*** A remnant of carpet in the shape of a square is advertised as 16 square yards. That will cover an area that measures 4 yards by 4 yards.

 ***Law enforcement:*** In order to find the speed of a car after a collision, an investigator can measure the length of the skid marks (L) and apply the formula: speed = 2$\sqrt{5L}$

***Computer programming:*** Square root and absolute value functions are often used in computer programming to ensure a positive number is used for calculations.

**Solve the following problems involving square roots:**

 **1.** What is the length of a square tablecloth that has an area of 3600 square centimeters?

 **2.** A square chessboard has an area of 144 square inches. How long is each side of the board?

 **3.** Your bedroom is a perfect square. If you had to order 225 square feet of carpet to cover the floor, how long is each side of your bedroom?