Worksheet 2-11: Squares and Square Roots

"Opposite" Math Operations: (So we can always work backward to check our answers!)

1. **Addition and Subtraction are opposite math operations.**

    e.g.,   If $23 + \mathbf{6} = 29$,   **(We add to find the answer.)**

                    then $? + \mathbf{6} = 29$

    We do the **opposite** operation: $29 - \mathbf{6} = ?$, so $? = \mathbf{23}$ **(We subtract to find the answer.)**

2. **Multiplication and Division are opposite math operations.**

    e.g.,   If $6 \times 7 = 42$,   **(We multiply to find the answer.)**

                    then $? \times 7 = 42$

    We do the opposite operation: $42 \div 7 = ?$, so $? = \mathbf{6}$ **(We divide to find the answer.)**

3. **Squares and Square Roots are opposite math operations.**

    e.g.,   If $8^2 = 64$,   **(We square to find the answer.)**

                    then $?^2 = 64$

    We do the **opposite** operation: $\sqrt{64} = ?$, so $? = \mathbf{8}$ *****(We take the square root of 64 to find the answer.)**

The Square Root of a number means when the square root of a number "*x*" is multiplied by itself, the result is the number *x*.

$$\textbf{i.e., } \sqrt{x} \times \sqrt{x} = x$$

Practice:

1. **Find the square of the following.**

(a) 5   (b) -15 (c) 0   (d) $\dfrac{2}{3}$

2. **Find the square roots of the following.**

(a) 36   (b) 289   (c) $\dfrac{1}{25}$ (d) $-81\,*$

6 is a square root of 36 because $6^2 = 36$. −6 is a square root of 36 as well because $(-6)^2 = 36$. However, −36 does not have a square root because no real number multiplied by itself results in a negative product.

Assigned Work: WS 2-11; Handout "Square Root Practice": #1-2, #4, #6-8; #12-16, #19

> **Perfect squares are** numbers with square roots that are integers; 64 is a perfect square because its square root are 8 and -8.

3. **Circle all the perfect squares.**

    9   99   16   121   218   256   400

> When the radical sign, $\sqrt{}$, is used, it indicates only the positive square root. Otherwise, when asked to find the square roots of a positive integer, give both the positive and the negative square roots.

4. (a) Find $\sqrt{49}$.   (b) Find $-\sqrt{121}$.   (c) Find $\sqrt{5}$.   (d) Find $\sqrt{-100}$.

5. **Simplify and evaluate.** *(Show steps.)*
    (a) $\sqrt{25} + \sqrt{4}$ (b) $\sqrt{49} - \sqrt{9}$

    (c) $\sqrt{\sqrt{25} - \sqrt{16}}$ (d) $\sqrt{16} \div \sqrt{4}$

6. **Calculate the length of the side and the perimeter of the square with an area of 200 cm². Round to 2 decimal places where necessary.**

7. **A square parking lot has a side length of 5 m. Another square parking lot has four times the area of this parking lot. What is the side length of the bigger parking lot?**

Answers: 1. (a) 25, (b) 225, (c) 0, (d) $\dfrac{4}{9}$; **2.** (a) ± 6 , (b) ± 17 , (c) $\pm\dfrac{1}{5}$, (d) undefined (no square root); **4.** (a) 7, (b) -11,
(c) 2.24, (d) undefined; **5.** (a) 7, (b) 4, (c) 1, (d) 2; **6.** side-length $= 14.14$ cm, perimeter $= 56.56$ cm; **7.** 10 m.