Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Day 11: Square Roots and Irrational Numbers**

To square a number, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

For example, what is 3 squared?

3 squared = $=3×3=9$



“Squared” is often written as a little 2 like this:

This says: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Square Roots**

A square root \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



3 squared is 9, so \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**The Square Root Symbol**

|  |  |  |
| --- | --- | --- |
| radical symbol |   | This is the special symbol that means "square root. It is called the ***radical***. |

We use it like this:


We would say ***"square root of 9 equals 3"***

A square root of a number is a value that can be **multiplied by itself** to give the original number. A square root of **9** is **3**, because **when 3 is multiplied by itself** we get **9**.

It is like asking: What can we multiply by itself to get this?

* But wait a minute! Can't the square root **also be −3**? Because (−3) × (−3) = **9** too.
* Well the **square root of 9** could be −3 or +3.

But when we use the **radical symbol √** we only give the **positive result**.

**Perfect Squares**

The perfect squares are the squares of the whole numbers:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | etc |
| **Perfect Squares:** | **1** | **4** |  |  |  |  |  |  |  |  |  |  |  |  |  | **...** |

Ex. 1)

i) $\sqrt{81}$ ii) 2$\sqrt{25}$ iii) - $\sqrt{256}$ iv) $\sqrt{1.44}$

 v) $\sqrt{16}$ vi) $\sqrt{25-16}$ \***The radical sign is like a bracket.**

 vii) $\sqrt{-49}$

Note: Numbers like $\sqrt{5}$ and $-\sqrt{17}$ cannot be written as a terminating or repeating decimal. They are called **irrational numbers**.

Ex. 2) Evaluating to the nearest tenth:

i) $\sqrt{41}$ ii) $-\sqrt{191}$ iii) 4 $\sqrt{2}$ + 3 $\sqrt{5}$ iv) $\frac{4\sqrt{7}}{3}$

Ex. 3) Evaluate for *a* = *5, b* = *- 2*

$$2.1 \sqrt{a^{2}-2ab+b^{2}}$$

Ex. 4) The area of a square is $98cm^{2}$, what is the length of each side? What is the perimeter?