Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_\_

**Squares, Square Roots, & Number Classification Guided Notes**

**Monday, August 13th**

**Do Now:** Answer the following SILENTLY & INDEPENDENTLY:

What is the big goal for the class?

Why do you think it’s important?

**> Squaring a Number**

* Squaring a number is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* When asked to square a number, it will be written in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.**
  + **Example**: 52
    - 5 is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - 2 is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
      * The exponent indicates how many times the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

* To properly state the problem, 52, it will be stated as **‘\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’** or **‘\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’**
* To solve the problem, we identify the exponent and multiply the base times itself the number of times indicated.
  + **Example**: 52 = 5x5 = 25

**> Beware of the Mistake!!!**

* Squaring a number is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, as multiplying the number by 2.
* If there is a 2 by the number, you are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, not multiplying it by 2.
  + 62 = 36
    - 6 x 6 = 36
  + 62 ≠ 12
  + 6 x 2 = 12
* Check back at your table to make sure you did not make this mistake.

**> Squaring a Number: Guided Practice**

* Identify the **base** in this problem:
  + 102
* Identify the **exponent** in this problem:
  + 62
* Identify the **exponent** in this problem:
  + 63
* Identify the **base** in this problem:
  + 82
* With your partner, discuss how you would solve this problem and how you would state this problem: 24
* Why do you think we call this squaring: 42?
  + Discuss with your partner and attempt to represent this problem with a picture.
* Why do you think we DON’T call this squaring: 43?
  + Discuss with your partner and attempt to represent this problem with a picture.

**> Squaring Numbers 1-15**

|  |  |
| --- | --- |
| 12 |  |
| 22 |  |
| 32 |  |
| 42 |  |
| 52 |  |
| 62 |  |
| 72 |  |
| 82 |  |
| 92 |  |
| 102 |  |
| 112 |  |
| 122 |  |
| 132 |  |
| 142 |  |
| 152 |  |

**> Taking the Square Root of a Number**

* Taking the square root of a number is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** operation of squaring a number.
  + Inverse means **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
* The symbol for square root is √ , which is called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* To solve the problem √64, you must determine **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to equal 64.
  + Please figure this out on your own for a few seconds.
* Thinking back on our chart, if every number in the right column was in a radical, the answer would equal the base number in the left column.

**> Taking the Square Root of a Number: Guided Practice**

Determine the square root of the numbers below:

* √100: \_\_\_\_\_\_
* √81: \_\_\_\_\_\_\_
* √64: \_\_\_\_\_\_
* √49: \_\_\_\_\_\_

**Tuesday, August 14th**

**Do Now:** Answer the following SILENTLY & INDEPENDENTLY:

1. Write how would you state this problem in two different ways: 72
2. Draw a picture representing why ‘squaring’ a number makes sense using 52.
3. Write how you would state this problem: √92

Perfect Squares

* A perfect square is a number that results in a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** when the square root is taken.
  + Example: √100 = Example: √49 = Example: √16 =

**> Imperfect Squares**

* An imperfect square is a number that results in a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** when the square root is taken.
  + Example: √52. (We know this is not a perfect square because if we try to draw our diagram, it will not work!)
* We can easily identify whether or not a number is a perfect square based on the numbers we learned yesterday in class, but we can also use our knowledge to estimate what the square root of a perfect square would be.
  + Example: √92
    - Which two perfect squares do we know that are before and after 92?
      * **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Find the square root of these perfect squares.
      * **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Therefore, we know our answer is:
      * Between **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
      * Because 92 is closer to 100 than is it to 81, we can estimate the square root of 92 as **\_\_\_\_\_\_\_\_\_\_\_\_.**

**> Imperfect Squares: Guided Practice**

Between which two perfect squares are the imperfect squares

* √48
* √17
* √46
* √14

Without using your calculator, determine whether or not these squares as perfect or imperfect.

|  |  |  |
| --- | --- | --- |
| **Number** | **Circle One** | |
| √100 | Perfect Square | Imperfect Square |
| √63 | Perfect Square | Imperfect Square |
| √5 | Perfect Square | Imperfect Square |
| √20 | Perfect Square | Imperfect Square |
| √80 | Perfect Square | Imperfect Square |

**Wednesday, August 15th**

**Do Now:** Answer the following **SILENTLY & INDEPENDENTLY:**

1. Estimate √45.
2. Calculate √36.
3. Explain the difference between a perfect and imperfect square.

> Types of Numbers

* There are 3 different types of numbers we will discuss today:
  1. Natural Numbers
  2. Whole Numbers
  3. Integers

1. Natural numbers are also known as **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* The lowest natural number is 1.
* There are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** natural numbers.
* There is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** because numbers go to infinity.
* Example: 1, 2, 3, 4, 5, 6 ….. ∞

1. Whole numbers are just like counting numbers, but **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* The lowest whole number is 0.
* There are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** whole numbers.
* There is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** because numbers go to infinity.
* Example: 0, 1, 2, 3, 4, 5, 6, 7 …… ∞

1. Integers are considered **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

* The lowest integer is -∞.
* There are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ∞**.
* Example: -∞, -20, -10, -9, 0, 2, 7, 10, 125….∞

**> Draw the Types of Numbers Diagram Below:**

**> Identifying Types of Numbers:**

* Identify each number as natural, whole, or integer. Numbers may fit into **more than one category.**
* **WE** will work on 1-4, you will work on 5-7 with your **PARTNER**, and do 8-10 **ON YOUR OWN**.
  1. -20: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 6. 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. 0: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 7. -10: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8. 87: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. 200: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 9. -∞: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. -1,256: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 10. ∞: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Put the numbers into the diagram above!**

**> Grouping Numbers into Subsets**

* **Example:** Which group of numbers consists of only whole numbers?
  1. (1, 2, 3)
  2. (-1, 0 ,1)
  3. (-2, -1, -3)
  4. (0, 1, 2)
* **Example:** Below is a subset of natural numbers. Which number could be added to this subset? (1, 10, 15, 35)
  1. -1
  2. -10
  3. 0
  4. ∞
* **Example:** Write the most specific subset each number could be classified as:
  1. 0: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. -64: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. √25: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. -32: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. 100: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_