

NAME: \_\_\_\_\_ PERIOD: \_\_\_\_\_

**CLASSWORK / HOMEWORK 4.10.19 (Due 4.12.19 BEGINNING OF CLASS)**

**SQUARES AND SQUARE ROOTS**

**SQUARES  
AND  
SQUARE ROOTS**

- We know that  $\sqrt{49}$  is \_\_\_\_\_ because \_\_\_\_\_ x \_\_\_\_\_ = 49.  
We could also write this as  $7^2 = 49$ .
- The inverse, or opposite, of squaring a number is to take the \_\_\_\_\_.
- Additionally, 49 is called a \_\_\_\_\_ because its square root is a whole number.

Practice your memory of perfect squares and square roots by filling out the tables below.

|       |  |
|-------|--|
| $1^2$ |  |
| $2^2$ |  |
| $3^2$ |  |
| $4^2$ |  |
| $5^2$ |  |
| $6^2$ |  |
| $7^2$ |  |
| $8^2$ |  |

|        |  |
|--------|--|
| $9^2$  |  |
| $10^2$ |  |
| $11^2$ |  |
| $12^2$ |  |
| $13^2$ |  |
| $14^2$ |  |
| $15^2$ |  |

|                |   |
|----------------|---|
| $\sqrt{\quad}$ | 1 |
| $\sqrt{\quad}$ | 2 |
| $\sqrt{\quad}$ | 3 |
| $\sqrt{\quad}$ | 4 |
| $\sqrt{\quad}$ | 5 |
| $\sqrt{\quad}$ | 6 |
| $\sqrt{\quad}$ | 7 |
| $\sqrt{\quad}$ | 8 |

|                |    |
|----------------|----|
| $\sqrt{\quad}$ | 9  |
| $\sqrt{\quad}$ | 10 |
| $\sqrt{\quad}$ | 11 |
| $\sqrt{\quad}$ | 12 |
| $\sqrt{\quad}$ | 13 |
| $\sqrt{\quad}$ | 14 |
| $\sqrt{\quad}$ | 15 |

**RATIONAL VS. IRRATIONAL NUMBERS**

**RATIONAL  
NUMBERS**

- Rational numbers are numbers that can be written as fractions or \_\_\_\_\_.
- Rational numbers include:
  - \_\_\_\_\_ and \_\_\_\_\_ decimals
  - Square roots of \_\_\_\_\_ squares

**IRRATIONAL  
NUMBERS**

- Irrational numbers cannot be written in fraction form.
- Irrational numbers include:
  - \_\_\_\_\_ and \_\_\_\_\_ decimals
  - Square roots of \_\_\_\_\_ squares

# ESTIMATING SQUARE ROOTS

## PERFECT SQUARES

- Perfect squares are numbers whose square roots are \_\_\_\_\_.
- Square roots of perfect squares are always \_\_\_\_\_ numbers.
- Examples of perfect squares: \_\_\_\_\_

## NON-PERFECT SQUARES

- Non-perfect squares are numbers whose square roots are \_\_\_\_\_ numbers.
- Examples of non-perfect squares: \_\_\_\_\_
- While the square root of a non-perfect square is irrational, we can use our knowledge of perfect squares to estimate their value.

Practice estimating square roots in each of the following questions.

1. Estimate the value of  $\sqrt{50}$ .

A. Use a number line to help you locate the closest perfect squares.



We know  $\sqrt{50}$  is between \_\_\_\_\_ and \_\_\_\_\_.

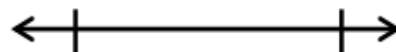
B. For a better estimate, determine which perfect square it is closest to:

- 50 is \_\_\_\_\_ away from 49.
- 50 is \_\_\_\_\_ away from 64.

Since 50 is closer to 49, the square root of 50 will be closer to \_\_\_\_\_ than \_\_\_\_\_. It should be just a little over 7.

A good decimal estimate would be  $\approx$  \_\_\_\_\_.

2. Estimate the value of  $\sqrt{22}$ .



- $\sqrt{22}$  is between \_\_\_\_\_ and \_\_\_\_\_, but closer to \_\_\_\_\_.
- Decimal estimate:  $\sqrt{22} \approx$  \_\_\_\_\_.

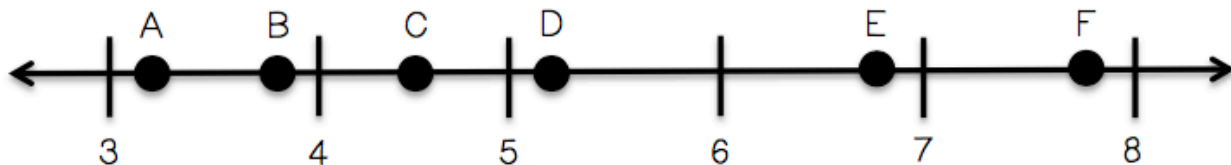
3. Estimate the value of  $\sqrt{103}$ .



- $\sqrt{103}$  is between \_\_\_\_\_ and \_\_\_\_\_, but closer to \_\_\_\_\_.
- Decimal estimate:  $\sqrt{103} \approx$  \_\_\_\_\_.

# ESTIMATING SQUARE ROOTS

1. Use the points on the number line to answer the questions below.



- Which point best represents  $\sqrt{47}$ ? \_\_\_\_\_
- Which point best represents  $\sqrt{27}$ ? \_\_\_\_\_
- Which point best represents  $\sqrt{11}$ ? \_\_\_\_\_

2. Estimate the value of  $\sqrt{13}$  by plotting it on a number line.



- Between \_\_\_\_\_ and \_\_\_\_\_.
- Decimal estimate:  $\approx$  \_\_\_\_\_.

3. Estimate the value of  $-\sqrt{150}$  by plotting it on a number line.



- Between \_\_\_\_\_ and \_\_\_\_\_.
- Decimal estimate:  $\approx$  \_\_\_\_\_.

4. Which of the following square roots is best represented by Point A?



- $\sqrt{7}$
- $\sqrt{12}$
- $\sqrt{15}$
- $\sqrt{8}$

5. Which of the following would be the best estimate for  $\sqrt{198}$ ?

- 14.1
- 14.5
- 14.7
- 15.1

6. Between which two integers would each of the following lie?

- $\sqrt{90}$  is between \_\_\_\_\_ and \_\_\_\_\_.
- $\sqrt{175}$  is between \_\_\_\_\_ and \_\_\_\_\_.
- $-\sqrt{12}$  is between \_\_\_\_\_ and \_\_\_\_\_.

7. Rebecca bought a square table for her kitchen. The area of the table's surface is 65 ft<sup>2</sup>. What is the approximate length of one side of the table?

|   |  |
|---|--|
| <p>4. Miranda bought a square frame that has an area of 30 square inches. What is the approximate side length of the frame?</p> <p style="text-align: right;">_____</p> | <p>5. Tristan wants to build a square garden in his backyard. If the garden is going to be 64 ft<sup>2</sup>, how many feet of material will he need for the perimeter of the garden?</p> <p style="text-align: right;">_____</p>  |
| <p>6. Which of the following is the best estimate of <math>\sqrt{90}</math> ?</p> <p>a. 9.1<br/>b. 9.4<br/>c. 9.7<br/>d. 9.9</p>  | <p>7. Which of the following statements is not true?</p> <p>a. The square root of 112 is between 10 &amp; 11.<br/>b. The square root of 180 is between 13 &amp; 14.<br/>c. The square root of 12 is between 4 &amp; 5.<br/>d. The square root of 5 is between 2 &amp; 3.</p> |

Fill in the following statements with either “sometimes”, “always” or “never” in order to make it a true statement.

8. Square roots of perfect squares will \_\_\_\_\_ be irrational numbers.
9. Repeating decimals will \_\_\_\_\_ be rational numbers.
10. Irrational numbers will \_\_\_\_\_ be able to be written as fractions.

| <b>REAL NUMBERS</b> | <b>DEFINITION</b>   | <b>EXAMPLES</b> |
|---------------------|---|-----------------|
| <b>Natural</b>      | <ul style="list-style-type: none"> <li>The set of all positive counting numbers (numbers on a number line); starting with _____</li> </ul>                            |                 |
| <b>Whole</b>        | <ul style="list-style-type: none"> <li>The set of all positive counting numbers starting with _____</li> </ul>  |                 |
| <b>Integers</b>     | <ul style="list-style-type: none"> <li>The set of whole numbers and their _____</li> </ul>  |                 |
| <b>Rational</b>     | <ul style="list-style-type: none"> <li>Numbers that can be written as fractions</li> <li>Terminating decimals, repeating decimals and _____ squares</li> </ul>        |                 |
| <b>Irrational</b>   | <ul style="list-style-type: none"> <li>Numbers that cannot be written as _____</li> <li>Non-terminating decimals, non-repeating decimals and _____ squares</li> </ul> |                 |