Algebra 1 Warm Up Section 2.1

Find the square of the number.

1. 14

2. 16

Complete the statements using <, >, or = .

3. -2.5 ___ $-\frac{19}{8}$

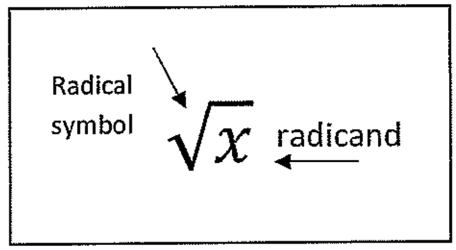
4. $\frac{5}{6}$ ___ $\frac{21}{25}$

5. A square room has a side length of 25 feet. What is its area?

2.1 Study Guide **The Real Number Line** **Algebra 1**

Objective: Goal 1: Find and approximate square roots.
Goal 2: Extend understanding of number system to include all real numbers.

Vocabulary:
If $b^2 = a$ then b is a **square root** of a.
All positive real numbers have two **square roots**, a positive square root (or *principle* square root) and a negative square root.



A square root is written with the radical symbol $\sqrt{\ }$.
The number or expression inside the radical symbol is the **radicand.**

The square of an integer is called a **perfect square.**

Zero has only one square root, 0. Negative real numbers do not have real square roots.

EXAMPLE 1
Find square roots

Evaluate the expression.

a. $\sqrt{400}$	**b.** $-\sqrt{16}$	**c.** $\pm\sqrt{81}$

Exercises for Example 1
Evaluate the expression.

1. $\sqrt{289}$	**2.** $-\sqrt{100}$	**3.** $\pm\sqrt{441}$
4. $\pm\sqrt{36}$	**5.** $\sqrt{49}$	**6.** $-\sqrt{9}$
7. $\sqrt{25}$	**8.** $\pm\sqrt{64}$	**9.** $-\sqrt{4}$

Homework:
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2.1 Study Guide The Real Number Line Algebra 1

PERFECT SQUARE CHART

Base number	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Base Squared	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
Perfect Square	4	9	16	25	36	49	64	81	100	121	144	169	196	225

EXAMPLE 2

Approximate a square root

Approximate $\sqrt{52}$ to the nearest integer, with and without a calculator.

Exercises for Example 2

Approximate the square root to the nearest integer.

10. $\sqrt{75}$	**11.** $\sqrt{240}$	**12.** $-\sqrt{120}$
13. $\sqrt{32}$	**14.** $\sqrt{103}$	**15.** $-\sqrt{48}$

Apply:

16. The top of a folding table is a square whose area is 945 square inches. Approximate the side length of the tale top to the nearest inch.	**17.** The top of a square box has an area of 320 square inches. Approximate the side length of the box top to the nearest inch.

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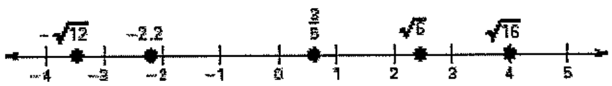
2.1 Study Guide | **The Real Number Line** | **Algebra 1**

EXAMPLE 3
Graph and order real numbers

Order the numbers from least to greatest: $\frac{3}{5}, \sqrt{16}, -2.2, -\sqrt{12}, \sqrt{6}$ **.**

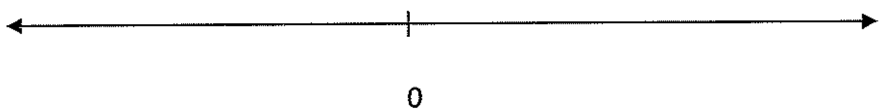
Solution
Begin by graphing the numbers on a number line.



Read the numbers from left to right: $-\sqrt{12}, -2.2, \frac{3}{5}, \sqrt{6}, \sqrt{16}$

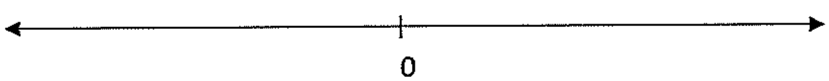
Exercises for Example 3

18. Put the following numbers on the number line: $-\frac{2}{3}, \frac{4}{4}, -\frac{3}{5}, 0.5, 0.333.., -0.25$



What is the easiest way to compare the fractions and decimals in the set?

19. Write the following numbers in increasing (least to greatest) order: -2, 4, 0, 1.5, ½ , $\frac{-3}{2}$



20. The table at the right shows the low temperatures recorded in Nome, Alaska, each day for five days in December.

Date	Temp(F°)
Dec 18	-10°F
Dec 19	-11°F
Dec 20	16°F
Dec 21	3°F
Dec 22	2°F

a) Which low temperature reading was the coldest?

b) Which dates had low temperatures above 10°F?

c) Which dates had low temperatures below -5°F?

Homework:

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2.1 Study Guide **The Real Number Line** **Algebra 1**

Real numbers are numbers that (are not imaginary) and can be organized into ________.
They can be pictured as points on a horizontal line called a real number line.
The point labeled 0 is the origin. Points to the left of zero represent negative numbers and points to the right of zero represent positive numbers. ZERO IS NEITHER POSITIVE NOR NEGATIVE!

Natural Numbers are counting numbers. They start with number 1 and continue to increase.

Ex:

Whole Numbers consist of all the natural numbers and 0.

Ex:

Integers include zero and all positive and negative whole numbers.

Ex:

Rational Numbers consist of all numbers that can be written as or converted to a fraction.

Ex: 2/3

Ex: 0.5

Ex: 0.33333...

Ex: 0.234

Ex: $\sqrt{16}$

Irrational Numbers are numbers that cannot be written as a fraction. They MUST be decimals that either are non-terminating (they go on forever) and non-repeating (they have no repeating pattern).

Ex: 0.835

Ex: 0.6666...

Ex: 7.45454545...

Ex: 2.64575131106.....

Ex: $\sqrt{11}$

Ex: π

An **irrational number** is a number that cannot be written as a quotient of two integers.

The set of **real numbers** is the set of all rational and irrational numbers.

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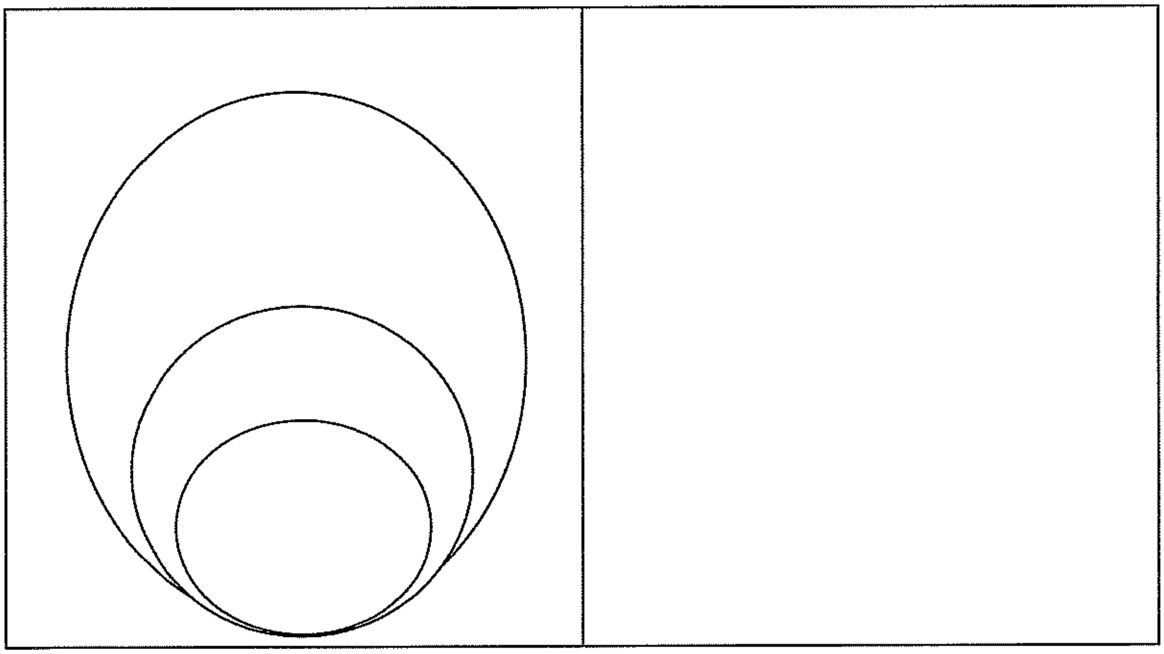
2.1 Study Guide | The Real Number Line | Algebra 1

Venn Diagram



EXAMPLE 4

Classify numbers

Tell whether each of the following numbers is a real number, a rational number, an irrational number, an integer, or a whole number:

Number	Real number?	Rational number?	Irrational number?	Integer?	Whole number?
$\sqrt{64}$					
$\sqrt{17}$					
$-\sqrt{36}$					
$-\frac{9}{2}$					
5.2					
0					
π					
0.3333...					

Homework:

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Name ______________________________ Date ____________________

2.1 Practice B

Evaluate the expression.

1. $\pm\sqrt{81}$	**2.** $\pm\sqrt{25}$	**3.** $-\sqrt{400}$
4. $\sqrt{625}$	**5.** $\sqrt{4900}$	**6.** $\pm\sqrt{169}$

Approximate the square root to the nearest integer.

7. $-\sqrt{29}$	**8.** $\sqrt{108}$	**9.** $-\sqrt{53}$
10. $\sqrt{138}$	**11.** $-\sqrt{55}$	**12.** $\sqrt{640}$

Tell whether each number in the list is a real number, a rational number, an irrational number, an integer, or a whole number. Then order the numbers from least to greatest.

13. $-\sqrt{16}, 3.2, -\frac{3}{2}, \sqrt{9}$	**14.** $\sqrt{5}, -6, 2.5, -\frac{24}{5}$

Evaluate the expression for the given value of *x*.

15. $14 + \sqrt{x}$ when $x = 16$	**16.** $\sqrt{x} - 5.5$ when $x = 4$
17. $-9 \cdot \sqrt{x}$ when $x = 25$	**18.** $2\sqrt{x} - 1$ when $x = 100$

Name ______________________________ Date ________________

2.1 Practice B

Word Problems

19. Park A local park is in the shape of a square and covers an area of 3600 square feet. Find the side length of the park.	**20. Wall Poster** You are considering buying a square wall poster that has an area of 6.25 square feet. Find the side length of the wall poster.
21. Road Sign The U.S. Department of Transportation determines the sizes of the traffic control signs that you see along the roadways. The square Pennsylvania state route sign at the  right has an area of 1296 square inches. Find the side length of the sign.	**22. Flower Bed** You are building the square flower bed shown using railroad ties. You want to place another railroad tie on the diagonal to form two triangular beds. Find the length of the diagonal by using the expression $\sqrt{2s^2}$