

Real Number Radar

Estimate, compare, and order real numbers.

GRADE 8 • 8.NS.1

8.NS.1 "The student will compare and order real numbers and determine the relationships between real numbers. Estimate and identify the two consecutive natural numbers between which the positive square root of a given number lies and justify which..."

NAME _____

DATE _____

COMPARE WITH DECIMALS

Square nearby natural numbers to trap a positive square root between them. For comparisons, rewrite fractions, percents, mixed numbers, and scientific notation as decimals, and round irrational values to the nearest hundredth.

WORKED EXAMPLE

Order $\sqrt{45}$, $27/4$, and 6.9 from least to greatest.

1. $6^2 = 36$ and $7^2 = 49$, so $\sqrt{45}$ is between 6 and 7.
2. $\sqrt{45}$ is about 6.71.
3. $27/4 = 6.75$.
4. Compare 6.71, 6.75, and 6.90.

Answer: $\sqrt{45}$, $27/4$, 6.9

PRACTICE 6 problems

- 1** Estimate $\sqrt{70}$ to the nearest hundredth. Between which two consecutive natural numbers does it lie? Which natural number is the better approximation?

ANSWER _____

- 2** Write each value to the nearest hundredth, then compare using $<$, $>$, or $=$: $-\sqrt{15}$ ____ -3.8

ANSWER _____

- 3** Order $5/2$, $\sqrt{8}$, and 2.75 from least to greatest.

ANSWER _____

- 4** Order 0.38 , $3/8$, and 37% from greatest to least.

ANSWER _____

- 5** Order $-\sqrt{11}$, -3.4 , and $-10/3$ from least to greatest.

ANSWER _____

- 6** Order $2\frac{3}{4}$, 2.8×10^0 , and n from least to greatest.

ANSWER _____

APPLY IT Show your work

- 1** A student is designing a square game screen with an area of 170 square inches. The side length is $\sqrt{170}$ inches. Estimate the side length to the nearest hundredth. Between which two consecutive natural numbers does it lie, and which is the better approximation?

WORK SPACE

ANSWER _____

- 2** In a video game, three jump distances are $17/2$ meters, 8.9 meters, and $\sqrt{80}$ meters. Rank the jumps from shortest to longest.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Order $-54/5$, $-\sqrt{120}$, -11 , -1120% , and -1.15×10^1 from greatest to least. Then write one sentence explaining how approximating $\sqrt{120}$ helps you place $-\sqrt{120}$.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Estimate $\sqrt{70}$ to the nearest hundredth. Between which two consecutive natural numbers does it lie? Which natural number is the better approximation?	$\sqrt{70}$ is about 8.37. It lies between 8 and 9, and 8 is the better approximation.
2	Write each value to the nearest hundredth, then compare using $<$, $>$, or $=$: $-\sqrt{15}$ ___ -3.8	$-\sqrt{15}$ is about -3.87, so $-\sqrt{15} < -3.8$.
3	Order $5/2$, $\sqrt{8}$, and 2.75 from least to greatest.	$5/2$, 2.75, $\sqrt{8}$
4	Order 0.38, $3/8$, and 37% from greatest to least.	0.38, $3/8$, 37%
5	Order $-\sqrt{11}$, -3.4, and $-10/3$ from least to greatest.	-3.4, $-10/3$, $-\sqrt{11}$
6	Order $2\frac{3}{4}$, 2.8×10^0 , and π from least to greatest.	$2\frac{3}{4}$, 2.8×10^0, π

PART 2 • APPLY IT

- $\sqrt{170}$ is about 13.04 inches. It lies between 13 and 14, and 13 is the better approximation.** Since $13^2 = 169$ and $14^2 = 196$, $\sqrt{170}$ is between 13 and 14. Because 170 is much closer to 169, the side length is closer to 13.
- $17/2$ meters, 8.9 meters, $\sqrt{80}$ meters** $17/2 = 8.5$ and $\sqrt{80}$ is about 8.94. Compare 8.50, 8.90, and 8.94.

CHALLENGE

Greatest to least: $-54/5$, $-\sqrt{120}$, -11, -1120%, -1.15×10^1 . Since $-\sqrt{120}$ is about -10.95, it falls between $-54/5 = -10.8$ and -11.

Accept equivalent decimal forms and correctly rounded hundredth approximations. For ordered lists, accept equivalent expressions if the values are in the correct order.