LESSON MAKER PRO

Real Number Roadmap

Use roots, benchmarks, and equivalent forms to compare 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..."

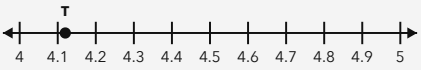
NAME _____ DATE _____

PLACE ROOTS AND COMPARE

If $n^2 < N < (n + 1)^2$, then $n < \sqrt{N} < n + 1$. If N is a perfect square, $\sqrt{N}$ equals a natural number, so it is not between two consecutive natural numbers. For close comparisons, use decimal approximations to the nearest hundredth, and remember that negatives farther left are smaller.

WORKED EXAMPLE

Point T is shown on the number line as an estimate for $\sqrt{17}$. Is T correctly placed?



1. $4^2 = 16$ and $5^2 = 25$, so $4 < \sqrt{17} < 5$.
2. $\sqrt{17}$ is about 4.12 to the nearest hundredth.
3. Point T is at 4.12 on the number line.

Answer: Yes. T is correctly placed because $\sqrt{17} \approx 4.12$.

PRACTICE 6 problems

1 The number line shows two estimates for $\sqrt{34}$. Which point is closer to $\sqrt{34}$? Explain with a hundredth approximation.



ANSWER _____

2 Find the two consecutive natural numbers between which $\sqrt{70}$ lies. Which natural number is the better approximation? Justify your choice.

ANSWER _____

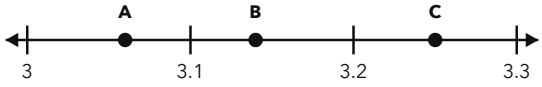
3 Write <, >, or = to compare: $-\sqrt{50}$ ___ -7.1

ANSWER _____

4 Order these numbers from least to greatest: $-\sqrt{2}$, -1.4, 58%, 3/5, π.

ANSWER _____

5 Which labeled point best locates π on the number line?



ANSWER _____

6 Order these numbers from greatest to least: 2 3/4, $\sqrt{8}$, 2.8.

ANSWER _____

APPLY IT Show your work

1 For a robotics club obstacle course, four routes are measured in meters: Route A is 2.4×10^0, Route B is $\sqrt{6}$, Route C is 246%, and Route D is 5/2. List the routes from shortest to longest.

WORK SPACE

ANSWER _____

2 In a parkour video game, four landing platforms have vertical positions in meters relative to the launch pad: -5.6, -5 1/2, $-\sqrt{30}$, and -5.45. List the platforms from lowest to highest.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Order these numbers from greatest to least: $-\pi$, -3.1, $-\sqrt{10}$, -310%, -3 1/8. Then justify the order using decimal equivalents.

WORK SPACE AND ANSWER

ANSWER KEY

Real Number Roadmap

GRADE 8 · 8.NS.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The number line shows two estimates for √34. Which point is closer to √34? Explain with a hundredth approximation.	**Q. √34 ≈ 5.83, so Q matches the nearest-hundredth approximation. P is 0.08 away from 5.83.**
2	Find the two consecutive natural numbers between which √70 lies. Which natural number is the better approximation? Justify your choice.	**√70 lies between 8 and 9. 8 is the better approximation because $8.5^2 = 72.25$ and 70 < 72.25, so √70 < 8.5.**
3	Write <, >, or = to compare: -√50 ___ -7.1	**-√50 > -7.1**
4	Order these numbers from least to greatest: -√2, -1.4, 58%, 3/5, π.	**-√2 < -1.4 < 58% < 3/5 < π**
5	Which labeled point best locates π on the number line?	**B, because π ≈ 3.14.**
6	Order these numbers from greatest to least: 2 3/4, √8, 2.8.	**√8 > 2.8 > 2 3/4**

PART 2 · APPLY IT

1. **A, B, C, D** Convert the values: A = 2.4, B ≈ 2.45, C = 2.46, and D = 2.5. Order the decimal values from least to greatest.
2. **-5.6, -5 1/2, -√30, -5.45** Use -√30 ≈ -5.48 and -5 1/2 = -5.5. On a number line, the more negative values are lower.

CHALLENGE

-3.1 = -310% > -3 1/8 > -π > -√10. Decimal equivalents include -3 1/8 = -3.125, -π ≈ -3.14, and -√10 ≈ -3.16.

Accept equivalent decimal approximations that preserve the correct order. For square-root estimates, accept reasonable hundredth values, including √30 ≈ 5.48 and √10 ≈ 3.16.