LESSON MAKER PRO

Roots on the Line

Estimate irrational values with nearby squares.

GRADE 8 · MA.8.NSO.1.1

MA.8.NSO.1.1 "Extend previous understanding of rational numbers to define irrational numbers within the real number system. Locate an approximate value of a numerical expression involving irrational numbers on a number line."

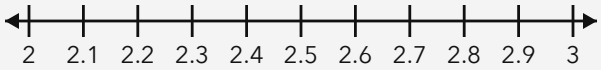
NAME _____ DATE _____

FIND THE SPOT

A number is rational if it can be written as a fraction. A square root of a nonperfect square is irrational. Compare nearby squares to estimate its decimal value on a number line.

WORKED EXAMPLE

Use the number line to locate sqrt(7) to the nearest tenth.



1. $2.6^2 = 6.76$ and $2.7^2 = 7.29$.
2. So sqrt(7) is between 2.6 and 2.7.
3. $2.65^2 = 7.0225$, so sqrt(7) is less than 2.65.
4. The nearest tenth is 2.6.

Answer: 2.6

PRACTICE 4 problems

1 Classify sqrt(49) as rational or irrational.

ANSWER _____

2 Between which consecutive whole numbers is sqrt(13)?

ANSWER _____

3 Estimate sqrt(30) to the nearest tenth.

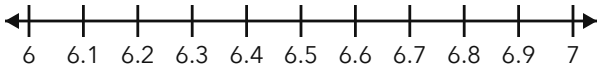
ANSWER _____

4 Estimate 1 + sqrt(10) to the nearest tenth.

ANSWER _____

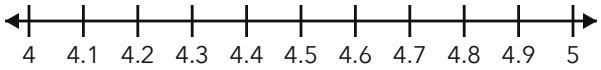
APPLY IT Show your work

1 A game designer plans a square practice zone with area 45 m^2. Its side length is sqrt(45) m. Use the number line to estimate the side length to the nearest tenth.



ANSWER _____

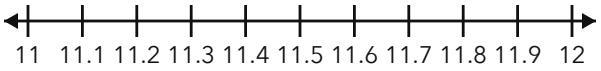
2 An art club makes a square poster with area 18 in^2. Each side is sqrt(18) inches. Use the number line to estimate a side length to the nearest tenth.



ANSWER _____

CHALLENGE One step up

Use the number line to estimate sqrt(20) + sqrt(45) to the nearest tenth. Explain how you know which tenth is closer.



WORK SPACE AND ANSWER

ANSWER KEY

Roots on the Line

GRADE 8 · MA.8.NSO.1.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Classify sqrt(49) as rational or irrational.	**rational**
2	Between which consecutive whole numbers is sqrt(13)?	**3 and 4**
3	Estimate sqrt(30) to the nearest tenth.	**5.5**
4	Estimate 1 + sqrt(10) to the nearest tenth.	**4.2**

PART 2 · APPLY IT

1. **6.7 m** $6.7^2 = 44.89$ and $6.8^2 = 46.24$. Since $6.75^2 = 45.5625$, sqrt(45) rounds to 6.7.
2. **4.2 inches** $4.2^2 = 17.64$ and $4.3^2 = 18.49$. Since $4.25^2 = 18.0625$, sqrt(18) rounds to 4.2.

CHALLENGE

11.2. $(\text{sqrt}(20) + \text{sqrt}(45))^2 = 125$. Since $11.15^2 = 124.3225$ and $11.2^2 = 125.44$, the value is between 11.15 and 11.2, so it rounds to 11.2.

Accept equivalent correct reasoning that compares squares or uses simplified radicals. Decimal answers should be rounded to the nearest tenth.