LESSON MAKER PRO

Root Route

Use squares to place square roots on a number line.

GRADE 8 · 8.NS.A.2

8.NS.A.2 "Locate rational approximations of irrational numbers on a number line, compare their sizes, and estimate the values of the irrational numbers."

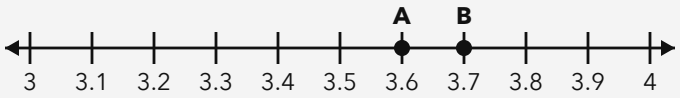
NAME _____ DATE _____

SQUARE, THEN PLACE

To locate a square root on a number line, square nearby tick marks to find where the root belongs. To decide which tick is closer, square the midpoint between the ticks and compare it with the number under the root.

WORKED EXAMPLE

Which marked point is closer to sqrt13?

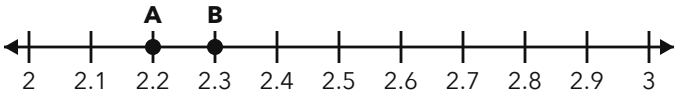


1. $3.6^2 = 12.96$ and $3.7^2 = 13.69$, so sqrt13 is between the points.
2. The midpoint is 3.65, and $3.65^2 = 13.3225$.
3. Because $13 < 13.3225$, sqrt13 is below the midpoint.

Answer: A (3.6) is closer to sqrt13.

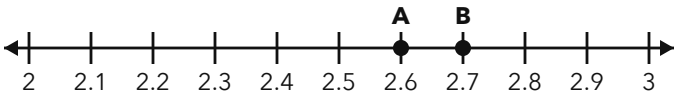
PRACTICE 6 problems

1 Which marked point is closer to sqrt5? Use the midpoint to decide.



ANSWER _____

2 Which marked point is closer to sqrt7? Use the midpoint to decide.



ANSWER _____

3 Use the marked number line to estimate sqrt20 to the nearest tenth.



ANSWER _____

4 Which is greater, sqrt18 or 4.3? Write your answer using < or >.

ANSWER _____

5 Between which two consecutive tenths does sqrt50 belong?

ANSWER _____

_____

6 Write sqrt2, 1.5, and sqrt3 in order from least to greatest.

ANSWER _____

APPLY IT Show your work

1 You design a square plaza in a game with an area of 45 square meters. About how long is one side, to the nearest tenth of a meter?

WORK SPACE

ANSWER _____

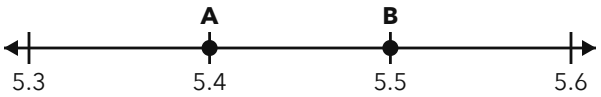
2 A square dance floor at a school event covers 60 square meters. A light strip is 7.8 meters long. Is it long enough to stretch along one side of the floor? Explain using squares.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Which marked point is closer to sqrt30? Explain using the midpoint and squares.



WORK SPACE AND ANSWER

ANSWER KEY # Root Route

GRADE 8 · 8.NS.A.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Which marked point is closer to sqrt5? Use the midpoint to decide.	**A (2.2)**
2	Which marked point is closer to sqrt7? Use the midpoint to decide.	**A (2.6)**
3	Use the marked number line to estimate sqrt20 to the nearest tenth.	**4.5**
4	Which is greater, sqrt18 or 4.3? Write your answer using < or >.	**sqrt18 < 4.3**
5	Between which two consecutive tenths does sqrt50 belong?	**7.0 and 7.1**
6	Write sqrt2, 1.5, and sqrt3 in order from least to greatest.	**sqrt2 < 1.5 < sqrt3**

PART 2 · APPLY IT

1. **6.7 meters** The side length is sqrt45. Since $6.75^2 = 45.5625 > 45$, sqrt45 is below the midpoint between 6.7 and 6.8 and rounds to 6.7.
2. **Yes. One side is sqrt60 meters, which is less than 7.8 meters.** Since $7.8^2 = 60.84 > 60$, the floor's side length is less than 7.8 meters.

CHALLENGE

B (5.5). The midpoint is 5.45, and $5.45^2 = 29.7025 < 30$. Since sqrt30 is above the midpoint and below 5.5, B is closer.

For number-line items, accept the point label or its value when either identifies the correct location. In the challenge, a correct explanation must compare sqrt30 with the midpoint.