

Root Road Map

Estimate irrational numbers and place them on a line.

GRADE 8 • TEKS 8.2.B

8.2.B "approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line;"

NAME _____

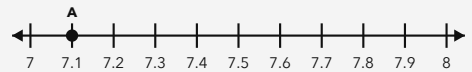
DATE _____

ESTIMATE AND LOCATE

Use nearby perfect squares to place a square root between whole numbers. Test nearby tenths, then round to the nearest tenth and mark that decimal on a number line.

WORKED EXAMPLE

Approximate $\sqrt{50}$ to the nearest tenth. Locate it on the number line.



1. $7^2 = 49$ and $8^2 = 64$, so $\sqrt{50}$ is between 7 and 8.

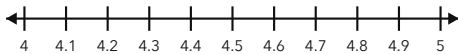
2. $0^2 = 49$ and $7.1^2 = 50.41$.

3. 50 is closer to 50.41, so $\sqrt{50}$ rounds to 7.1.

Answer: $\sqrt{50} \approx 7.1$, at point A.

PRACTICE 5 problems

- 1** Approximate $\sqrt{20}$ to the nearest tenth. Mark that value on the number line.



ANSWER _____

- 2** Approximate $\sqrt{80}$ to the nearest tenth. Write the tick mark you would use.

ANSWER _____

- 3** Use $\pi \approx 3.14$. Round π to the nearest tenth and name the tick mark.

ANSWER _____

- 4** Approximate $\sqrt{145}$ to the nearest tenth.

ANSWER _____

- 5** Approximate $\sqrt{200}$ to the nearest tenth.

ANSWER _____

APPLY IT Show your work

- 1** A circular gaming arena has a diameter of 18 m. Its distance around is 18π m. Use $\pi \approx 3.14$. About how many meters is one lap, to the nearest meter? Name the whole-number tick you would mark.

WORK SPACE

ANSWER _____

- 2** A square dance floor has an area of 130 square feet. Its side length is $\sqrt{130}$ feet. Approximate the side length to the nearest tenth. Between which two whole-number marks does it belong?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Use $\pi \approx 3.14$. Round π , $\sqrt{10}$, and $\sqrt{11}$ to the nearest tenth. List the three approximations from left to right on a number line. Explain your reasoning with nearby squares.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Approximate $\sqrt{20}$ to the nearest tenth. Mark that value on the number line.	$\sqrt{20} \approx 4.5$. Mark 4.5.
2	Approximate $\sqrt{80}$ to the nearest tenth. Write the tick mark you would use.	8.9
3	Use $n \approx 3.14$. Round n to the nearest tenth and name the tick mark.	3.1
4	Approximate $\sqrt{145}$ to the nearest tenth.	12.0
5	Approximate $\sqrt{200}$ to the nearest tenth.	14.1

PART 2 • APPLY IT

1. **57 m, tick 57.** Compute $18 \times 3.14 = 56.52$. Round 56.52 to 57.
2. **11.4 feet, between 11 and 12.** Since $11^2 = 121$ and $12^2 = 144$, $\sqrt{130}$ is between 11 and 12. Testing tenths gives $\sqrt{130} \approx 11.4$.

CHALLENGE

$n \approx 3.1$, $\sqrt{10} \approx 3.2$, $\sqrt{11} \approx 3.3$. From left to right: n , $\sqrt{10}$, $\sqrt{11}$. Since $3.1^2 = 9.61$ and $3.2^2 = 10.24$, $\sqrt{10}$ rounds to 3.2. Since $3.3^2 = 10.89$ and $3.4^2 = 11.56$, $\sqrt{11}$ rounds to 3.3.

Accept equivalent notation such as 4.5 for the marked tick. For square roots, accept only the stated nearest-tenth values, including 12.0 for $\sqrt{145}$.