LESSON MAKER PRO

Irrational Number Hunt

Locate, compare, and estimate irrational values.

GRADE 8 · 8.NS.A.2

CCSS.Math.Content.8.NS.A.2 "Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π 2). For example..."

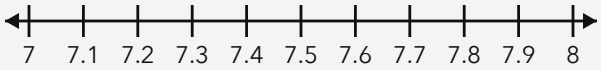
NAME _____ DATE _____

ZOOM IN WITH SQUARES

To locate sqrt(n), find consecutive decimals whose squares are below and above n. More decimal places give a closer location, and a decimal approximation lets you compare irrational numbers or estimate expressions.

WORKED EXAMPLE

Use the number line. Between which two tenths does sqrt(50) lie? Give an approximation to the nearest hundredth.

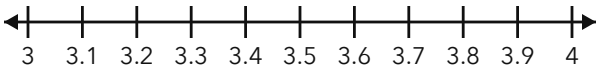


1. $7^2 = 49$ and $8^2 = 64$, so sqrt(50) is between 7 and 8.
2. $7.0^2 = 49$ and $7.1^2 = 50.41$, so sqrt(50) is between 7.0 and 7.1.
3. sqrt(50) is about 7.07.

Answer: Between 7.0 and 7.1; sqrt(50) ≈ 7.07.

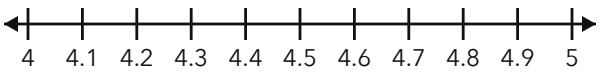
PRACTICE 4 problems

1 Use the number line. Between which two tenths does sqrt(12) lie?



ANSWER _____

2 Use the number line. Between which two tenths does sqrt(20) lie?



ANSWER _____

3 Which is greater: sqrt(18) or 4.25?

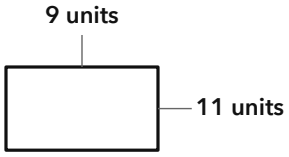
ANSWER _____

4 Use pi ≈ 3.14. Estimate pi^2 to the nearest tenth.

ANSWER _____

APPLY IT Show your work

1 The game arena shown is a rectangle. A player runs straight from one corner to the opposite corner. Estimate the run to the nearest tenth of a unit.



ANSWER _____

2 A music app lists one clip as sqrt(13) minutes and another as 3.5 minutes. Which clip is longer?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without a calculator, show that sqrt(45) is between 6.70 and 6.71. Use squares in your reasoning.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the number line. Between which two tenths does sqrt(12) lie?	**sqrt(12) is between 3.4 and 3.5.**
2	Use the number line. Between which two tenths does sqrt(20) lie?	**sqrt(20) is between 4.4 and 4.5.**
3	Which is greater: sqrt(18) or 4.25?	**4.25 is greater than sqrt(18).**
4	Use pi ≈ 3.14. Estimate pi^2 to the nearest tenth.	**9.9**

PART 2 · APPLY IT

1. **14.2 units** The diagonal is sqrt(9^2 + 11^2) = sqrt(202). Since 14.2^2 = 201.64 and 14.3^2 = 204.49, it rounds to 14.2.
2. **The sqrt(13)-minute clip is longer.** Since 3.6^2 = 12.96 and 3.7^2 = 13.69, sqrt(13) is about 3.6, which is greater than 3.5.

CHALLENGE

6.70^2 = 44.89 and 6.71^2 = 45.0241. Since 44.89 < 45 < 45.0241, 6.70 < sqrt(45) < 6.71.

Accept equivalent inequality statements for the interval answers. For the comparison items, accept a correct decimal approximation that supports the conclusion.