LESSON MAKER PRO

Square Root Neighbors

Use nearby perfect squares to estimate square roots.

GRADE 8 · 8.NS.1.a

8.NS.1.a "Estimate and identify the two consecutive natural numbers between which the positive square root of a given number lies and justify which natural number is the better approximation. Numbers are limited to natural numbers from 1 to 400."

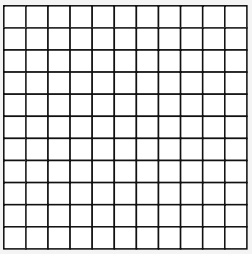
NAME _____ DATE _____

FIND THE NEAREST SQUARE

Find the two perfect squares on either side of the number. Their square roots are the consecutive natural numbers that surround the square root you want. Compare the distances to decide which natural number is closer.

WORKED EXAMPLE

Use the square array. Between which consecutive natural numbers does sqrt(130) lie? Which is the better approximation?



1. 11 × 11 = 121.
2. 12 × 12 = 144, so 121 < 130 < 144.
3. 130 is 9 from 121 and 14 from 144.

Answer: sqrt(130) lies between 11 and 12. 11 is the better approximation.

PRACTICE 4 problems

1 Estimate sqrt(50). Name the two consecutive natural numbers and the better approximation.

ANSWER _____

2 Estimate sqrt(80). Name the two consecutive natural numbers and the better approximation.

ANSWER _____

3 Estimate sqrt(210). Name the two consecutive natural numbers and the better approximation.

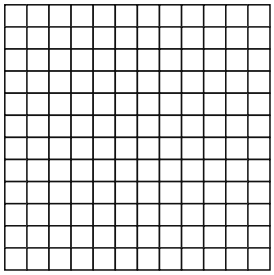
ANSWER _____

4 Estimate sqrt(300). Name the two consecutive natural numbers and the better approximation.

ANSWER _____

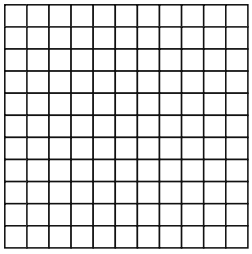
APPLY IT Show your work

1 Use the square mural grid as one benchmark. A new square mural will cover 150 tiles. Between which two side lengths does its side length lie? Which whole-number side length is closer?



ANSWER _____

2 Use the square game board as one benchmark. A designer wants a new square board with an area of 115 tiles. Between which two side lengths does its side length lie? Which whole-number side length is closer?



ANSWER _____

CHALLENGE One step up

Find the least natural number N for which sqrt(N) lies between 19 and 20 and 20 is the better approximation. Explain your reasoning.

WORK SPACE AND ANSWER

ANSWER KEY

Square Root Neighbors

GRADE 8 · 8.NS.1.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Estimate sqrt(50). Name the two consecutive natural numbers and the better approximation.	**sqrt(50) lies between 7 and 8. 7 is the better approximation.**
2	Estimate sqrt(80). Name the two consecutive natural numbers and the better approximation.	**sqrt(80) lies between 8 and 9. 9 is the better approximation.**
3	Estimate sqrt(210). Name the two consecutive natural numbers and the better approximation.	**sqrt(210) lies between 14 and 15. 14 is the better approximation.**
4	Estimate sqrt(300). Name the two consecutive natural numbers and the better approximation.	**sqrt(300) lies between 17 and 18. 17 is the better approximation.**

PART 2 · APPLY IT

1. **The side length is between 12 and 13 tiles. 12 tiles is closer.** 12 × 12 = 144 and 13 × 13 = 169. Since 150 is 6 from 144 and 19 from 169, 12 is closer.
2. **The side length is between 10 and 11 tiles. 11 tiles is closer.** 10 × 10 = 100 and 11 × 11 = 121. Since 115 is 15 from 100 and 6 from 121, 11 is closer.

CHALLENGE

N = 381. The nearby perfect squares are 361 and 400. Since 381 is 20 from 361 and 19 from 400, 20 is the better approximation.

Accept answers that name the correct consecutive natural numbers and identify the closer one. Students may justify by comparing distances to the two nearby perfect squares.