LESSON MAKER PRO

Root Sense

Estimate square roots to compare and calculate.

GRADE 8 · 8.NR.1.2

8.NR.1.2 "Approximate irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions."

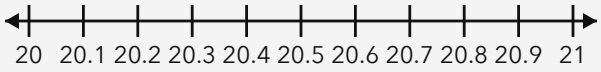
NAME _____ DATE _____

ESTIMATE WITH SQUARES

To approximate a square root, test nearby tenths by squaring them. The square root lies between the tenths whose squares are on opposite sides of the number. Estimate each square root in an expression, then add or subtract the estimates.

WORKED EXAMPLE

Use the number line to approximate sqrt(420) to the nearest tenth.



1. $20.4^2 = 416.16$.
2. $20.5^2 = 420.25$.
3. Since 420 is closer to 420.25, sqrt(420) is about 20.5.

Answer: 20.5

PRACTICE 6 problems

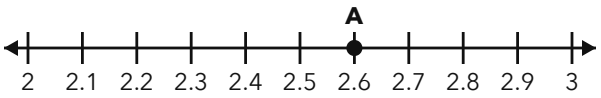
1 Approximate sqrt(18) to the nearest tenth.

ANSWER _____

2 Which number is greater, sqrt(45) or 6.7?

ANSWER _____

3 Point A best represents which value: sqrt(6), sqrt(7), or sqrt(8)?

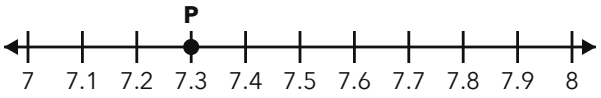


ANSWER _____

4 Estimate sqrt(12) + sqrt(27) to the nearest whole number.

ANSWER _____

5 Point P best represents which value: sqrt(52), sqrt(53), or sqrt(55)?



ANSWER _____

6 Estimate sqrt(75) - sqrt(10) to the nearest tenth.

ANSWER _____

APPLY IT Show your work

1 A student is designing a square light panel for a gaming desk. The panel has an area of 50 square centimeters. Estimate the side length of the panel to the nearest tenth of a centimeter.

WORK SPACE

ANSWER _____

2 A phone has a rectangular display that is 7 cm wide and 9 cm tall. The diagonal length is sqrt(130) cm. Estimate the diagonal to the nearest tenth of a centimeter.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Estimate sqrt(19) + sqrt(43) to the nearest tenth. Then explain whether the exact sum is less than or greater than 11.

WORK SPACE AND ANSWER

ANSWER KEY # Root Sense

GRADE 8 · 8.NR.1.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Approximate sqrt(18) to the nearest tenth.	**4.2**
2	Which number is greater, sqrt(45) or 6.7?	**sqrt(45) is greater than 6.7.**
3	Point A best represents which value: sqrt(6), sqrt(7), or sqrt(8)?	**sqrt(7)**
4	Estimate sqrt(12) + sqrt(27) to the nearest whole number.	**9**
5	Point P best represents which value: sqrt(52), sqrt(53), or sqrt(55)?	**sqrt(53)**
6	Estimate sqrt(75) - sqrt(10) to the nearest tenth.	**5.5**

PART 2 · APPLY IT

1. **7.1 cm** The side length is sqrt(50). Since $7.1^2 = 50.41$ and $7.0^2 = 49$, sqrt(50) is about 7.1.
2. **11.4 cm** Compare nearby tenths: $11.4^2 = 129.96$ and $11.5^2 = 132.25$. Therefore sqrt(130) is about 11.4.

CHALLENGE

sqrt(19) + sqrt(43) is about 10.9, and the exact sum is less than 11. Since sqrt(19) < 4.36 and sqrt(43) < 6.56, their sum is less than 10.92, which is less than 11.

Accept equivalent decimal estimates rounded to the requested place value. For the challenge, accept any valid comparison using squared tenths or hundredths that proves the sum is less than 11.