NAME DATE PERIOD

Unit 8, Lesson 5: Reasoning About Square Roots

Let's approximate square roots.

5.1: True or False: Squared

Decide if each statement is true or false.

$\left(\sqrt{5}\right)^2 = 5$

$\left(\sqrt{10}\right)^2 = 100$

$\left(\sqrt{9}\right)^2 = 3$

$\left(\sqrt{16}\right) = 2^2$

$7 = \left(\sqrt{7}\right)^2$

5.2: Square Root Values

What two whole numbers does each square root lie between? Be prepared to explain your reasoning.

1. $\sqrt{7}$

2. $\sqrt{23}$

3. $\sqrt{50}$

4. $\sqrt{98}$

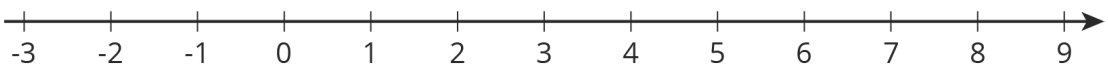
Are you ready for more?

Can we do any better than "between 3 and 4" for $\sqrt{12}$? Explain a way to figure out if the value is closer to 3.1 or closer to 3.9.

NAME DATE PERIOD

5.3: Solutions on a Number Line

The numbers x, y, and z are positive, and $x^2 = 3$, $y^2 = 16$, and $z^2 = 30$.



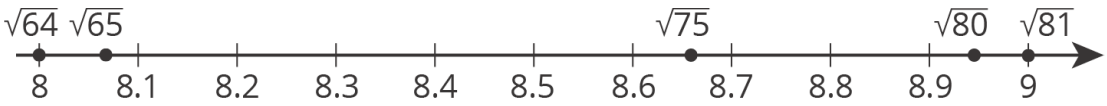
1. Plot x, y, and z on the number line. Be prepared to share your reasoning with the class.

2. Plot $-\sqrt{2}$ on the number line.

Lesson 5 Summary

In general, we can approximate the values of square roots by observing the whole numbers around it, and remembering the relationship between square roots and squares. Here are some examples:

- $\sqrt{65}$ is a little more than 8, because $\sqrt{65}$ is a little more than $\sqrt{64}$ and $\sqrt{64} = 8$.
- $\sqrt{80}$ is a little less than 9, because $\sqrt{80}$ is a little less than $\sqrt{81}$ and $\sqrt{81} = 9$.
- $\sqrt{75}$ is between 8 and 9 (it's 8 point something), because 75 is between 64 and 81.
- $\sqrt{75}$ is approximately 8.67, because $8.67^2 = 75.1689$.



If we want to find a square root between two whole numbers, we can work in the other direction. For example, since $22^2 = 484$ and $23^2 = 529$, then we know that $\sqrt{500}$ (to pick one possibility) is between 22 and 23.

Many calculators have a square root command, which makes it simple to find an approximate value of a square root.

NAME DATE PERIOD

Unit 8, Lesson 5: Reasoning About Square Roots

1. a. Explain how you know that $\sqrt{37}$ is a little more than 6.

b. Explain how you know that $\sqrt{95}$ is a little less than 10.

c. Explain how you know that $\sqrt{30}$ is between 5 and 6.

2. Plot each number on the number line:

$$6, \sqrt{83}, \sqrt{40}, \sqrt{64}, 7.5$$

3. Mark and label the positions of two square root values between 7 and 8 on the number line.

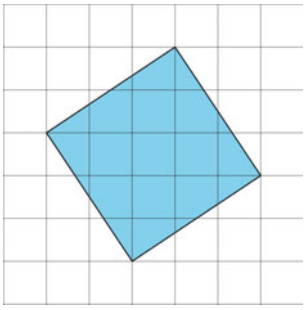
NAME DATE PERIOD

4. Select all the irrational numbers in the list.

$$\frac{2}{3}, \frac{-123}{45}, \sqrt{14}, \sqrt{64}, \sqrt{\frac{9}{1}}, -\sqrt{99}, -\sqrt{100}$$

(from Unit 8, Lesson 3)

5. Each grid square represents 1 square unit. What is the exact side length of the shaded square?



(from Unit 8, Lesson 2)

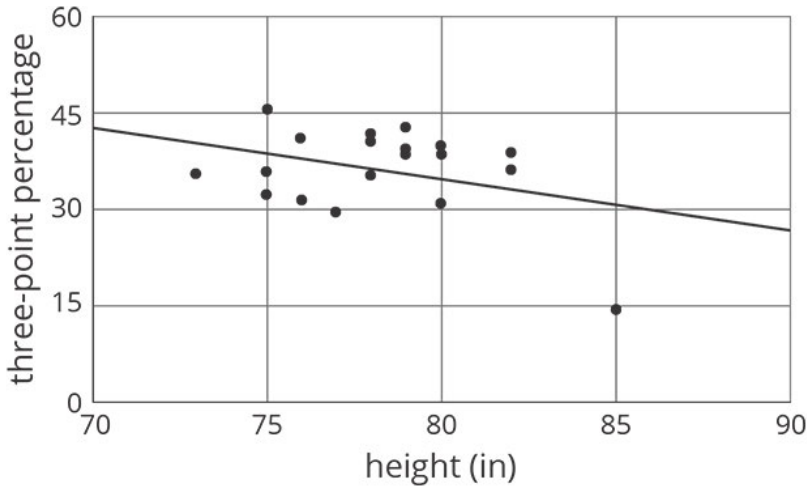
6. For each pair of numbers, which of the two numbers is larger? Estimate how many times larger.

a. $0.37 \cdot 10^6$ and $700 \cdot 10^4$
b. $4.87 \cdot 10^4$ and $15 \cdot 10^5$
c. $500,000$ and $2.3 \cdot 10^8$

(from Unit 7, Lesson 10)

7. The scatter plot shows the heights (in inches) and three-point percentages for different basketball players last season.

NAME DATE PERIOD



a. Circle any data points that appear to be outliers.

b. Compare any outliers to the values predicted by the model.

(from Unit 6, Lesson 4)