

12-1 Study Guide and Intervention

Estimating Square Roots

Recall that a perfect square is a square of a rational number. In Lesson 5-8, you learned that any number that can be written as a fraction is a rational number. A number that cannot be written as a fraction is an irrational number.

Example 1 Estimate $\sqrt{40}$ to the nearest whole number.

List some perfect squares.

1, 4, 9, 16, 25, 36, 49, ...

$$36 < 40 < 49$$

40 is between the perfect squares 36 and 49.

$$\sqrt{36} < \sqrt{40} < \sqrt{49}$$

Find the square root of each number.

$$6 < \sqrt{40} < 7$$

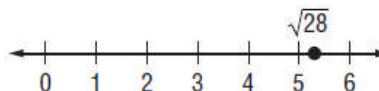
$$\sqrt{36} = 6 \text{ and } \sqrt{49} = 7$$

So, $\sqrt{40}$ is between 6 and 7. Since 40 is closer to 36 than to 49, the best whole number estimate is 6.

Example 2 Graph $\sqrt{28}$ on a number line.

2nd $\sqrt{\quad}$ 28 ENTER 5.291502622

$$\sqrt{28} \approx 5.3$$



Check for Reasonableness Since $5^2 = 25$ and 25 is close to 28, the answer is reasonable.

Exercises

Estimate each square root to the nearest whole number.

1. $\sqrt{3}$ 2

2. $\sqrt{8}$ 3

3. $\sqrt{26}$ 5

4. $\sqrt{41}$ 6

5. $\sqrt{61}$ 8

6. $\sqrt{94}$ 10

7. $\sqrt{152}$ 12

8. $\sqrt{850}$ 29

Graph each square root on a number line.

