

11-2

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.

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

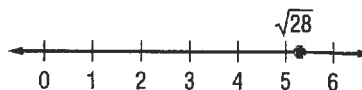
$$\sqrt{36} = 6 \text{ and } \sqrt{49} = 7$$

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 Use a calculator to find the value of $\sqrt{28}$ to the nearest tenth.

$$\boxed{2nd} \quad \boxed{\sqrt{}} \quad 28 \quad \boxed{=}$$

5.291502622



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

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

EXERCISES

Estimate each square root to the nearest whole number.

$$1. \sqrt{3} \approx 2$$

$$2. \sqrt{8} \approx 3$$

$$3. \sqrt{26} \approx 5$$

$$4. \sqrt{41} \approx 6$$

$$5. \sqrt{61} \approx 8$$

$$6. \sqrt{94} \approx 10$$

$$7. \sqrt{152} \approx 12$$

$$8. \sqrt{850} \approx 29$$

use a calculator!

Use a calculator to find each square root to the nearest tenth.

$$9. \sqrt{2} \approx 1.4$$

$$10. \sqrt{27} \approx 5.2$$

*use a calculator!
Round properly!*

$$11. \sqrt{73} \approx 8.5$$

$$12. \sqrt{82} \approx 9.1$$

$$13. \sqrt{105} \approx 10.2$$

$$14. \sqrt{395} \approx 19.9$$

$$15. \sqrt{846} \approx 29.1$$

$$16. \sqrt{2,298} \approx 47.9$$

11-2**Practice: Skills*****Estimating Square Roots*****Estimate each square root to the nearest whole number.**

1. $\sqrt{5}$

2. $\sqrt{10}$

3. $\sqrt{21}$

4. $\sqrt{28}$

5. $\sqrt{78}$

6. $\sqrt{102}$

7. $\sqrt{179}$

8. $\sqrt{274}$

9. $\sqrt{303}$

10. $\sqrt{563}$

11. $\sqrt{592}$

12. $\sqrt{755}$

13. $\sqrt{981}$

14. $\sqrt{1,356}$

15. $\sqrt{1,688}$

16. $\sqrt{3,287}$

17. $\sqrt{3,985}$

18. $\sqrt{4,125}$

Use a calculator to find each square root to the nearest tenth.

19. $\sqrt{6}$

20. $\sqrt{19}$

21. $\sqrt{30}$

22. $\sqrt{77}$

23. $\sqrt{114}$

24. $\sqrt{125}$

25. $\sqrt{149}$

26. $\sqrt{182}$

27. $\sqrt{212}$

28. $\sqrt{436}$

29. $\sqrt{621}$

30. $\sqrt{853}$

31. $\sqrt{918}$

32. $\sqrt{1,004}$

33. $\sqrt{1,270}$

34. $\sqrt{5,438}$

35. $\sqrt{4,215}$

36. $\sqrt{5,786}$

37. Order $\frac{25}{7}$, 4.91, and $\sqrt{23}$ from least to greatest.38. Graph $\sqrt{42}$ and $\sqrt{62}$ on the same number line.