Math 8
Lesson S2: Estimating Square Roots of Non-Perfect Squares

Recall:
- ✓ A **perfect square** is a number created by squaring a whole number (or multiplying a whole number by itself).
- ✓ Perfect squares are related to the **area** of a square (base x height).
- ✓ A **square root** is the number that is multiplied by itself to create a perfect square.

A **non-perfect square** is a number that cannot be created by squaring a whole number.

Examples of Perfect Squares	Example of Non-Perfect Squares

Investigate: Work with a partner. Use the number line below to place each square root on the number line to show its approximate value:

$$\sqrt{2}, \sqrt{4}, \sqrt{5}, \sqrt{11}, \sqrt{18}, \sqrt{24}, \sqrt{25}$$

Benchmarking is method that can be used to estimate the square root of a non-perfect square. The idea is to find the 2 consecutive perfect squares that surround the non-perfect square, and then to use the square roots of the perfect square to estimate the square root of the non-perfect square.

Example 1: Use benchmarking to estimate the square root of 10.

Example 2: Use benchmarking to estimate the square root of 75.

Checking your estimate: To check the answer to a square root, do the opposite: square it!

Example 3: Is 5.1 or 5.2 a better estimate of $\sqrt{27}$?

Name: _____   **Date:** _____

Square Roots Worksheet
Developing

Estimate the answers to 1 decimals.

1 a. $\sqrt{4}$ **1 b.** $\sqrt{115}$ **1 c.** $\sqrt{20}$

2 a. $\sqrt{45}$ **2 b.** $\sqrt{46}$ **2 c.** $\sqrt{88}$

3 a. $\sqrt{82}$ **3 b.** $\sqrt{90}$ **3 c.** $\sqrt{71}$

4 a. $\sqrt{49}$ **4 b.** $\sqrt{140}$ **4 c.** $\sqrt{38}$

5 a. $\sqrt{73}$ **5 b.** $\sqrt{51}$ **5 c.** $\sqrt{2}$

6 a. $\sqrt{41}$ **6 b.** $\sqrt{94}$ **6 c.** $\sqrt{59}$

Square Roots Worksheet
Proficient

Estimate   the answers to 1 decimals.

1 a. $\sqrt{216}$

1 b. $\sqrt{136}$

1 c. $\sqrt{198}$

2 a. $\sqrt{131}$

2 b. $\sqrt{186}$

2 c. $\sqrt{113}$

3 a. $\sqrt{143}$

3 b. $\sqrt{109}$

3 c. $\sqrt{192}$

4 a. $\sqrt{148}$

4 b. $\sqrt{200}$

4 c. $\sqrt{111}$

5 a. $\sqrt{185}$

5 b. $\sqrt{132}$

5 c. $\sqrt{207}$

6 a. $\sqrt{123}$

6 b. $\sqrt{127}$

6 c. $\sqrt{156}$

Square Roots Worksheet

Extending

Estimate the answers to 2 decimals.

1 a. $\sqrt{23}$

1 b. $\sqrt{315}$

2 a. $\sqrt{327}$

2 b. $\sqrt{293}$

3 a. $\sqrt{299}$

3 b. $\sqrt{253}$

4 a. $\sqrt{368}$

4 b. $\sqrt{70}$