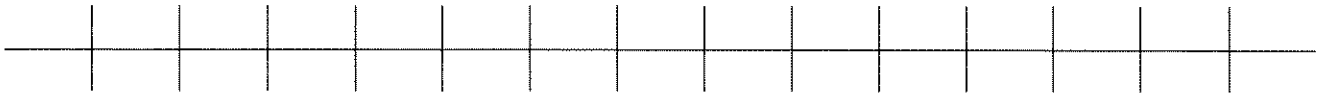
M9

2.4 Square Roots of Whole Numbers

- It is possible to use a number line to estimate a square root of any positive integer.
- It is important to label the number line carefully.



Examples:

1. Use the above number line to determine between which two numbers each square root lies.

How does it work? Let's look at $\sqrt{19}$.

$$\sqrt{19}$$

Q: What two perfect squares does number 19 lie on the number line?

A: 19 lies between 16 and 25.

Q: What are the square roots of 16 and 25?

A: 4 and 5

Conclusion: $\sqrt{19}$ must be between 4 and 5.

$\sqrt{28}$	
$\sqrt{150}$	
$\sqrt{58}$	
$\sqrt{12}$	
$\sqrt{85}$	

2. Using the number line on page 1 determine between which two square roots of perfect squares each number lies.

How does it work? Let's look at 7.9

7.9

Q: What two integers does number 7.9 lie on the number line?

A: 7.9 lies between 7 and 8.

Q: What are the values of 7^2 and 8^2 ?

A: 49 and 64

3. Conclusion: 7.9 must be between $\sqrt{49}$ and $\sqrt{64}$.

3.3	
1.2	
4.9	
9.2	
7.1	

3. Using a number line, estimate the square root of a number that not a perfect square.

A) Estimate $\sqrt{30}$ to the nearest tenth.

B) Estimate $\sqrt{26}$ to the nearest tenth.

C) Estimate $\sqrt{34}$ to the nearest tenth.

4. Use a calculator to compare your estimates from question #3. Round the answers to the nearest tenth. Were your estimates close?

	$\sqrt{30}$	$\sqrt{26}$	$\sqrt{34}$
Estimate using the number line.			
Rounded value using a calculator			
Close? Yes or No			