

Date: _____

3.3 Notes: Estimating Square Roots

Chris is 15 and is the oldest of 3 siblings. His sister, Jamie, is 10 and is the youngest. How old could their brother, Ryan, be?

Jamie Ryan Chris
 10 11, 12, 13, 14 15

Many square roots are not easy to find out without using your calculator, but you can estimate how big they are if you know a number that is smaller and a number that is larger.

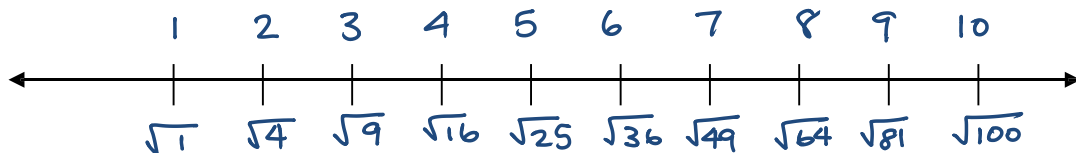
Finding square root on my calculator:

use $\sqrt{\quad}$ button

$\boxed{2nd}$ $\sqrt{\quad}$ \leftarrow
 $\boxed{x^2}$

Complete table for the first 10 natural numbers and what they are the square root of:

1	2	3	4	5	6	7	8	9	10
$\sqrt{1}$	$\sqrt{4}$	$\sqrt{9}$	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{36}$	$\sqrt{49}$	$\sqrt{64}$	$\sqrt{81}$	$\sqrt{100}$



Without using a calculator, estimate each of the following and explain why you chose your answer

\approx approx. equal

$\sqrt{14}$ $\sqrt{9} < \sqrt{14} < \sqrt{16}$
 $3 < \sqrt{14} < 4$

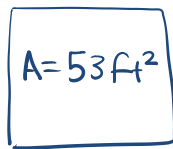
$\sqrt{14} \approx 3.73$
 $\sqrt{14} \approx 3\frac{5}{7}$

$\sqrt{75}$ $\sqrt{64} < \sqrt{75} < \sqrt{81}$
 $8 < \sqrt{75} < 9$

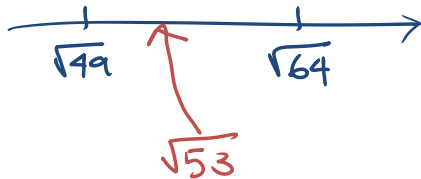
$\sqrt{75} \approx 8.7$
 $\sqrt{75} \approx 8.6$

Example:

Charlie buys a square mat with an area of 53 square feet. Will it fit in a room that measures 8 feet by 10 feet?



$$\begin{aligned} \text{each side} &= \sqrt{A} \\ &= \sqrt{53 \text{ ft}^2} \end{aligned}$$



$$\sqrt{49} < \sqrt{53} < \sqrt{64}$$

$$7 < \sqrt{53} < 8$$

$$\sqrt{53} \approx 7.3$$

$$\approx 7.28$$

$$\approx 7\frac{4}{15}$$

yes, the mat will fit in the 8 x 10 ft room.

Example:

What are 3 whole numbers that have a square root between 3 and 5?

OMIT

$$4^2 = 16$$

$$\sqrt{16} = 4$$

$$\underline{16}$$

$$\begin{array}{ccc} \sqrt{9} & \sqrt{16} & \sqrt{25} \\ 3 & 4 & 5 \end{array}$$

$$9, 16, 25$$

OMIT

How many whole numbers are there that have a square root between 3 and 5?

$$3 = \sqrt{9}$$

$$5 = \sqrt{25}$$

10, 11, 12, 13, 14, 15, 16, 17, 18, 19,

20, 21, 22, 23, 24

There are 15 whole numbers that have a square root between 3 and 5.