1.3: Introducing Irrational Numbers

Understand Irration Numbers and the Number Line.

If $1/4$ is close to zero, $\frac{1}{8}$ is closer. In the same way, $\frac{1}{16}$ is closer than $\frac{1}{8}$. Following this logic there are infinitely many rational numbers clustered close to zero.

Activity

1) Draw a square that has a length of 2 inches on a piece of paper. Then cut out the square.
2) Find the Area of the square. $4 in^2$
3) Fold the four vertices of square towards the center to form a new square.
4) State how the areas of square A and square B are related. State the area of Square B. How can you represent the length of a side of square B.

→

Area of square A is $4 in^2$. Area of square B = $\frac{1}{2}$ of area of square A = $2 in^2$.

Side length of square B = $\sqrt{2}$ in

~~(3)~~ 5) Use your answer in step 4, find the length of a side of square B with a calculator. Round answer to two decimal places. 1.41 in

6) Place Square B along the edge of a ruler to measure its length. Explain why the answer is different.

<u>Answer</u>: When you measure using a ruler, you can only measure to the nearest $\frac{1}{16}$ of an inch.

☆ Edge Length between $1\frac{3}{8}$ in & $1\frac{7}{16}$ in ☆

<u>Using Rational Approximation to Locate Irrational Numbers on a Number Line</u>

$\sqrt{2}$

$\boxed{\text{Step 1}}$ Find an approximate value of $\sqrt{2}$ using a calculator.

$\boxed{\text{Step 2}}$ Approximate number to nearest tenth between two whole numbers.

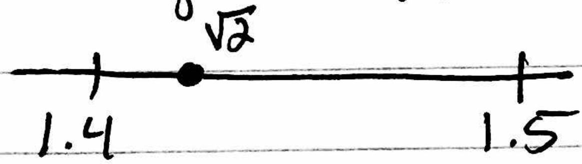
$\boxed{\text{Step 3}}$ Locate the two numbers it is inbetween of the number line.

$\boxed{\text{Step 4}}$ Use the approximate value of $\sqrt{2}$ to 2 decimal places.

$\boxed{\text{Step 5}}$ Find out which tenth place the number is closer to 1-4 lower 5 through 9 upper.

Example $\sqrt{2} = 1.4142$

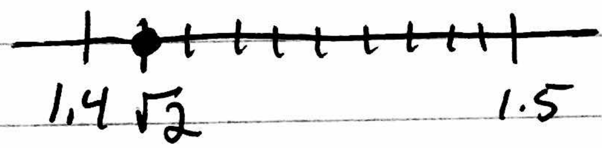
(1)



1.4 and 1.5

$1.4 < \sqrt{2} < 1.5$

1.41



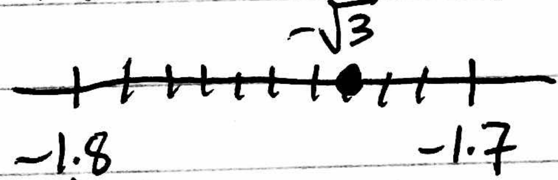
Closer to 1.4

(2) $-\sqrt{3} = -1.73205\ldots$

$-1.8 < -\sqrt{3} < -1.7$

$-1.8 < -1.73 < -1.7$

Closer to -1.7



(3) $-\sqrt{7} \approx -2.646$

$-2.7 < -\sqrt{7} < -2.6$

$-2.7 < -2.64 < -2.6$