



Where do irrationals live?

Putting $\sqrt{30}$ on a number line

- Today: bracket first, estimate second, never halve.

The wrong instinct

- $\sqrt{30}$... between 15 and 16?

Check it: $15 \times 15 = 225$. Nowhere near 30.

Bracket with perfect squares

- Squares: 1, 4, 9, 16, **25**, **36**, 49, 64...
- $25 < 30 < 36$, so $5 < \sqrt{30} < 6$.

Which end is it nearer?

- Try 5.5: $5.5 \times 5.5 = 30.25$.
- That is just over 30, so $\sqrt{30}$ is just under 5.5.

$\sqrt{30} = 5.477...$ Bracketing got us there without a calculator.

Your turn

- Bracket $\sqrt{50}$, $\sqrt{8}$, $\sqrt{90}$.

Turn & talk: which perfect squares did you reach for?

Comparing: square both sides

- Is 1.5 bigger than $\sqrt{2}$?
- $1.5^2 = 2.25$ and $(\sqrt{2})^2 = 2$.
- $2.25 > 2$, so $1.5 > \sqrt{2}$.

A longer decimal is not a bigger number

- $\pi = 3.14159\dots$ $\sqrt{10} = 3.16227\dots$
- Decided at the second decimal place.

$\pi^2 \approx 9.87$ and $(\sqrt{10})^2 = 10$, so $\sqrt{10}$ is the bigger one.

On the line

- Mark $\sqrt{2}$, $\sqrt{8}$, π , $\sqrt{30}$ between 0 and 6.

Bracket each one first. Then place it.