ESTIMATING SQUARE ROOTS

IF A GIVEN NUMBER IS NOT A PERFECT SQUARE, IT MEANS ITS SQ. ROOT WILL NOT BE A WHOLE #.

IT WILL BE DECIMAL #
EX: $\sqrt{20} = 4.47$

SO...

WHEN FINDING THE SQ. ROOT OF A NON-PERFECT # WE CAN **ESTIMATE** WHAT THE # WILL BE

STEP 1: ABOVE & BELOW PERFECT #'S

16 — $\sqrt{14}$ — 9

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

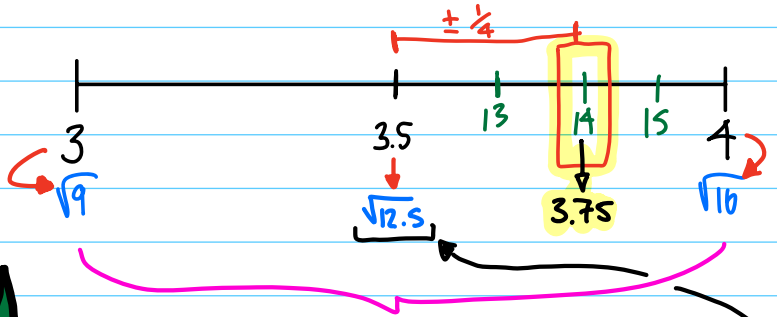
TRANSLATION: THE $\sqrt{14}$ WILL BE BETWEEN $\sqrt{9} = 3$ AND $\sqrt{16} = 4$

SO... 3.something

TO FIND THE SOMETHING, USE A NUMBER LINE

STEP 2: NUMBER LINE

- MAKE NUMBER LINE
- FIND MIDPOINT
- PLACE STARTING # ON NUMBER LINE
- ESTIMATE √ROOT



WE CAN THEN THEN ESTIMATE

SO...

difference from 16 → 9 is 7. ½ of 7 is 3.5 so... ADD THAT to LOW # for MIDPOINT.

LOWER SQ. ROOT (9 in this example)

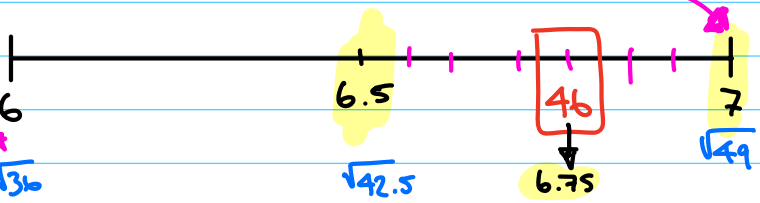
$\sqrt{14} = \pm 3.75$

FYI → $\sqrt{14} = 3.74$

ABOVE: $\sqrt{49} = 7$

BELOW: $\sqrt{36} = 6$

$\sqrt{46}$



6.5

Difference 36 → 49 = 13

$\frac{1}{2}$ of 13 = 6.5

So the Midpoint will be...

$\sqrt{36} + 6.5 = 42.5$

$\sqrt{46} = \pm 6.75$