Math 8 3.3: Estimating Square Roots

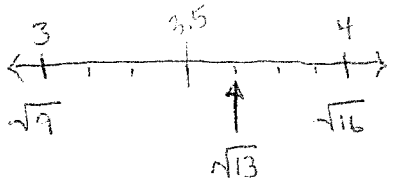
Recall: Some numbers (squares) have a "square root" that is an integer:

| | | |
|---|---|---|
| $\sqrt{1} = 1$ | | $1 \times 1 = 1$ |
| $\sqrt{4} = 2$ | | $2 \times 2 = 4$ |
| $\sqrt{9} = 3$ | | $3 \times 3 = 9$ |
| $\sqrt{16} = 4$ | | $4 \times 4 = 16$ |
| $\sqrt{25} = 5$ | | $5 \times 5 = 25$ |
| ↑ | | ↑ |
| All sq. roots | | perfect squares |

- They are called perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
- All the other numbers are NOT perfect squares. Their square roots are NOT integers.
  - ↳ we estimate their values

Ex. Estimate:

a) $\sqrt{13}$

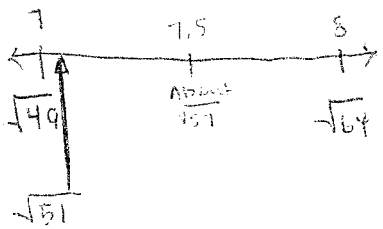



① Draw a # line
② 13 is b/tw the P.S. 9 and 16. Write these on # line (as $\sqrt{9}$ and $\sqrt{16}$)
③ Find $\sqrt{9}$ (=3) and $\sqrt{16}$ (=4), Label
④ Evenly divide bottom... Label with $\sqrt{13}$
⑤ Best guess as "something" – more than ½

$\sqrt{13} \approx 3.6$ or $3.7$

(≈ means approx.)

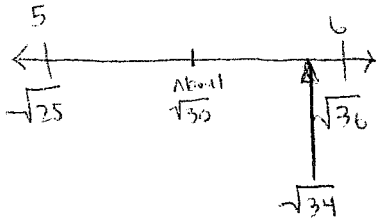
b) $\sqrt{51}$




So close to 7

$\sqrt{51} \approx 7.1$

a) $\sqrt{34}$




$^3/_4^+$ of the way... Almost @ 6

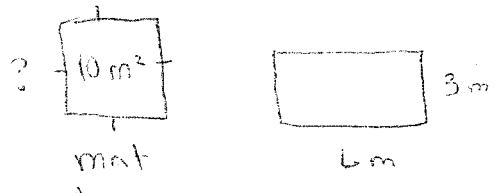
$\sqrt{34} \approx 5.8$

Ex. Identify all the whole #'s with a square root between 3 and 4.

$3^2 = 9$ > Everything b/tw 9 and 16 must have a S.R. b/tw 3 and 4.
$4^2 = 16$

So : 10, 11, 12, 13, 14, 15

Ex. Lucy is trying to play twister in a 3m × 6m room. The square mat measures $10m^2$. Will it fit?





Find side length $\sqrt{10} = 3.1m$ (Estimate)

No. the mat doesn't fit.