## APPROXIMATIONS OF SQUARE ROOTS ON NUMBER LINES

You can approximate irrational square roots and plot your approximations on number lines. **Let's try it!** Follow the steps below to approximate  $\sqrt{41}$  and plot the approximation on a number line.

Find the perfect squares that 41 lies between.

The number 41 lies between the perfect squares 36 and 49. So,  $\sqrt{41}$  lies between  $\sqrt{36}$ , or 6, and  $\sqrt{49}$ , or 7.

Approximate  $\sqrt{41}$  to the nearest tenth. Choose decimals between 6 and 7, and square them to find the decimals that  $\sqrt{41}$  falls between.

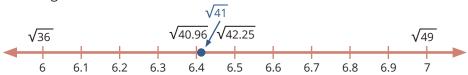
Since 41 is about halfway between 36 and 49, square a decimal about halfway between 6 and 7. Here, let's try 6.5.

 $6.5^2 = 42.25$  Since  $6.5^2 > 41$ , a square root of 6.5 is too large. Square 6.4.  $6.4^2 = 40.96$  Since  $6.4^2 < 41$ , a square root of 6.4 is too small.

 $\sqrt{41}$  must be between 6.4 and 6.5. Since 41 is closer to 6.4<sup>2</sup> than 6.5<sup>2</sup>, 6.4 is the better approximation for  $\sqrt{41}$ . So,  $\sqrt{41} \approx 6.4$ .

Label the number line from 6 to 7, and plot the approximation.

You know  $\sqrt{41}$  is slightly bigger than 6.4, so plot the approximation slightly to the right of 6.4.



**Practice!** Approximate each irrational square root to the nearest tenth. Then, label the number line and plot the approximation.

1

2

3

4



**Challenge!** Think about how you could find more accurate approximations. How could you find an approximation to the nearest hundredth?