

## Lesson 20: Quadratics and Irrationals

- Let's explore irrational numbers.

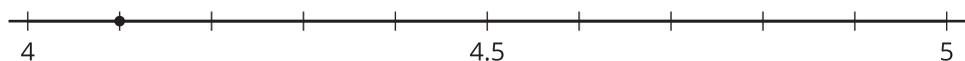
### 20.1: Where is $\sqrt{21}$ ?

Which number line accurately plots the value of  $\sqrt{21}$ ? Explain your reasoning.

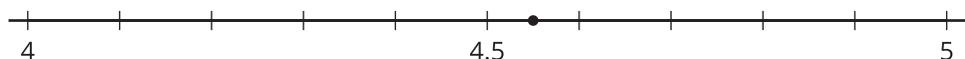
A



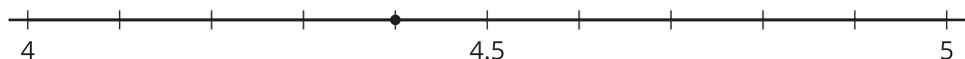
B



C



D



### 20.2: Some Rational Properties

Rational numbers are fractions and their opposites.

- All of these numbers are rational numbers. Show that they are rational by writing them in the form  $\frac{a}{b}$  or  $-\frac{a}{b}$  for integers  $a$  and  $b$ .
  - 6.28
  - $-\sqrt{81}$
  - $\sqrt{\frac{4}{121}}$
  - 7.1234
  - $0.\bar{3}$
  - $\frac{1.1}{13}$

2. All rational numbers have decimal representations, too. Find the decimal representation of each of these rational numbers.

a.  $\frac{47}{1,000}$

b.  $-\frac{12}{5}$

c.  $\frac{\sqrt{9}}{6}$

d.  $\frac{53}{9}$

e.  $\frac{1}{7}$

3. What do you notice about the decimal representations of rational numbers?

### 20.3: Approximating Irrational Values

Although  $\sqrt{2}$  is irrational, we can approximate its value by considering values near it.

1. How can we know that  $\sqrt{2}$  is between 1 and 2?

2. How can we know that  $\sqrt{2}$  is between 1.4 and 1.5?

3. Approximate the next decimal place for  $\sqrt{2}$ .

4. Use a similar process to approximate the  $\sqrt{5}$  to the thousandths place.