## 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.

1. 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 $b$.
	1. 6.28
	2. $-\sqrt{81}$
	3. $\sqrt{\frac{4}{121}}$
	4. -7.1234
	5. $0.\overline{3}$
	6. $\frac{1.1}{13}$
2. All rational numbers have decimal representations, too. Find the decimal representation of each of these rational numbers.
	1. $\frac{47}{1,000}$
	2. $-\frac{12}{5}$
	3. $\frac{\sqrt{9}}{6}$
	4. $\frac{53}{9}$
	5. $\frac{1}{7}$
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.



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