

Comparing Rational and Irrational Numbers

For each pair of numbers, decide which is larger without using a calculator. Explain your choices.

- a. π^2 or 9
- b. $\sqrt{50}$ or $\sqrt{51}$
- c. $\sqrt{50}$ or 8
- d. -2π or -6

Commentary

This task can be used to either build or assess initial understandings related to rational approximations of irrational numbers.

Solutions

- a. Start with $\pi > 3$, so $\pi^2 > 9$; we can square both sides and conclude that $\pi^2 > 9$.
- b. $\sqrt{50} < \sqrt{51}$

We know the following:
 $50 < 51$ and $(\sqrt{50})^2 = 50$, and $(\sqrt{51})^2 = 51$. By substituting, we obtain $(\sqrt{50})^2 < (\sqrt{51})^2$; taking the square root of both quantities gives us $\sqrt{50} < \sqrt{51}$.
- c. We know that $7^2 = 49$ and $8^2 = 64$. We also know that $\sqrt{49} < \sqrt{50} < \sqrt{64}$. So $\sqrt{50} < \sqrt{64}$, which means that $\sqrt{50} < 8$.
- d. $\pi > 3$; multiplying gives us $2\pi > 2 \times 3$. If you look at these numbers on the number line, that means that 2π is farther to the right than 6. When you look at their opposites, -2π will be farther to the left than -6 , so $-2\pi < -6$.