Comparing and Ordering Real Numbers

To determine which of two real numbers is greater, express each number as a decimal. Then compare the numbers.

EXAMPLE

1 **Replace each ● with <, >, or = to make a true sentence.**

a. $\frac{4}{7}$ ● $0.\overline{5}$

$\frac{4}{7} \approx 0.57$ Round to the nearest hundredth.

$0.\overline{5} \approx 0.56$

Since $0.57 > 0.56$, $\frac{4}{7} > 0.\overline{5}$.

b. $\frac{1}{8}$ ● $\frac{1}{\sqrt{18}}$

$\frac{1}{8} = 0.125$ Use a calculator to find a rational approximation of $\frac{1}{\sqrt{18}}$.

$\frac{1}{\sqrt{18}} \approx 0.236$

Since $0.125 < 0.236$, $\frac{1}{8} < \frac{1}{\sqrt{18}}$.

To order real numbers, first express each number as a decimal. Then write the decimals in order from least to greatest, and write the corresponding real numbers in the same order.

EXAMPLE

2 **Order $2.\overline{54}$, $-\sqrt{6}$, $\frac{9}{4}$, and $\frac{22}{-9}$ from least to greatest.**

$2.\overline{54} = 2.545454\ldots$ or about 2.55

$-\sqrt{6} = -2.44948974\ldots$ or about -2.45

$\frac{9}{4} = 2.25$

$\frac{22}{-9} = -2.4444\ldots$ or about -2.44

$-2.45 < -2.44 < 2.25 < 2.55$

Thus, the order from least to greatest is $-\sqrt{6}, \frac{22}{-9}, \frac{9}{4}, 2.\overline{54}$.