

Study Guide and Intervention

7NSI.1

Comparing and Ordering Rational Numbers

When comparing two or more rational numbers, either write the numbers as fractions with the same denominator or write the numbers as decimals.

Example 1 Replace ● with $<$, $>$, or $=$ to make $\frac{4}{5}$ ● $\frac{7}{10}$ a true sentence.

Write as fractions with the same denominator. The least common denominator is 10.

$$\frac{4}{5} = \frac{4 \cdot 2}{5 \cdot 2} \text{ or } \frac{8}{10}$$

$$\frac{7}{10} = \frac{7 \cdot 1}{10 \cdot 1} \text{ or } \frac{7}{10}$$

Since $\frac{8}{10} > \frac{7}{10}$, $\frac{4}{5} > \frac{7}{10}$.

Example 2 Order the set of rational numbers -3.25 , $-3\frac{1}{3}$, $-3\frac{2}{5}$, and $-3.\overline{25}$ from least to greatest.

Write $-3\frac{1}{3}$ and $-3\frac{2}{5}$ as decimals.

$$\frac{1}{3} = 0.\overline{3}, \text{ so } -3\frac{1}{3} = -3.\overline{3}.$$

$$\frac{2}{5} = 0.4, \text{ so } -3\frac{2}{5} = -3.4.$$

Since $-3.4 < -3.\overline{3} < -3.\overline{25} < -3.25$, the numbers from least to greatest are $-3\frac{2}{5}$, $-3\frac{1}{3}$, $-3.\overline{25}$, and -3.25 .

Exercises

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

1. $\frac{5}{6}$ ● $\frac{2}{3}$

2. $\frac{4}{5}$ ● $\frac{13}{15}$

3. $\frac{1}{9}$ ● $\frac{1}{8}$

4. $-\frac{2}{3}$ ● $-\frac{7}{10}$

5. $3\frac{7}{10}$ ● $3\frac{4}{5}$

6. $-2\frac{3}{7}$ ● $-2\frac{4}{9}$

7. 2.6 ● $2\frac{5}{8}$

8. $4\frac{1}{6}$ ● $4.\overline{16}$

9. $-4.\overline{58}$ ● $-4.\overline{58}$

Order each set of rational numbers from least to greatest.

10. $0.5, 0.1, \frac{1}{4}, \frac{2}{3}$

11. $2.4, 2\frac{4}{7}, 2.13, 1\frac{9}{10}$

12. $\frac{1}{5}, -0.7, 0.25, -\frac{3}{5}$

13. $1\frac{2}{9}, 1\frac{2}{3}, 1.45, 1.67$

14. $-2\frac{1}{4}, -2.28, -2.7, -2\frac{4}{5}$

15. $4\frac{2}{3}, 4\frac{5}{6}, 4.6, 5.3$

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Scientific Notation

A number in scientific notation is written as the product of a factor and a power of ten.

Example 1 Write 8.65×10^7 in standard form.

$$\begin{aligned} 8.65 \times 10^7 &= 8.65 \times 10,000,000 & 10^7 &= 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \text{ or } 10,000,000 \\ &= 86,500,000 & & \text{Move the decimal point 7 places to the right.} \end{aligned}$$

Example 2 Write 9.2×10^{-3} in standard form.

$$\begin{aligned} 9.2 \times 10^{-3} &= 9.2 \times \frac{1}{10^3} & 10^{-3} &= \frac{1}{10^3} \\ &= 9.2 \times 0.001 & \frac{1}{10^3} &= \frac{1}{1,000} \text{ or } 0.001 \\ &= 0.0092 & & \text{Move the decimal point 3 places to the left.} \end{aligned}$$

Example 3 Write 76,250 in scientific notation.

$$\begin{aligned} 76,250 &= 7.625 \times 10,000 & & \text{The decimal point moves 4 places.} \\ &= 7.625 \times 10^4 & & \text{The exponent is positive.} \end{aligned}$$

Example 4 Write 0.00157 in scientific notation.

$$\begin{aligned} 0.00157 &= 1.57 \times 0.001 & & \text{The decimal point moves 3 places.} \\ &= 1.57 \times 10^{-3} & & \text{The exponent is negative.} \end{aligned}$$

Exercises

Write each number in standard form.

- | | |
|---------------------------|-------------------------|
| 1. 5.3×10^1 | 2. 9.4×10^3 |
| 3. 7.07×10^5 | 4. 2.6×10^{-3} |
| 5. 8.651×10^{-2} | 6. 6.7×10^{-6} |

Write each number in scientific notation.

- | | |
|---------------|--------------|
| 7. 561 | 8. 14 |
| 9. 56,400,000 | 10. 0.752 |
| 11. 0.0064 | 12. 0.000581 |

Study Guide and Intervention

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Comparing Fractions, Decimals, and Percents

- To write a percent as a decimal, divide by 100 and remove the percent symbol.
- To write a decimal as a percent, multiply by 100 and add the percent symbol.
- To express a fraction as a percent, you can use a proportion. Alternatively, you can write the fraction as a decimal, and then express the decimal as a percent.

Example 1 Write 56% as a decimal.

$$56\% = \underbrace{56}_{\text{Divide by 100 and remove the percent symbol.}}\% \\ = 0.56$$

Example 2 Write 0.17 as a percent.

$$0.17 = \underbrace{0.17}_{\text{Multiply by 100 and add the percent symbol.}} \\ = 17\%$$

Example 3 Write $\frac{7}{20}$ as a percent.**Method 1** Use a proportion.

$$\begin{aligned} \frac{7}{20} &= \frac{x}{100} && \text{Write the proportion.} \\ 7 \cdot 100 &= 20 \cdot x && \text{Find cross products.} \\ 700 &= 20x && \text{Multiply.} \\ \frac{700}{20} &= \frac{20x}{20} && \text{Divide each side by 20.} \\ 35 &= x && \text{Simplify.} \end{aligned}$$

Method 2 Write as a decimal.

$$\begin{aligned} \frac{7}{20} &= \underbrace{0.35}_{\text{Convert to a decimal by dividing.}} \\ &= 35\% && \text{Multiply by 100 and add the} \\ &&& \text{percent symbol.} \end{aligned}$$

So, $\frac{7}{20}$ can be written as 35%.**Exercises****Write each percent as a decimal.**

1. 10%

2. 36%

3. 82%

4. 49.1%

Write each decimal as a percent.

5. 0.14

6. 0.59

7. 0.932

8. 1.07

Write each fraction as a percent.

9. $\frac{3}{4}$

10. $\frac{7}{10}$

11. $\frac{9}{16}$

12. $\frac{1}{40}$