NAME _____ DATE _____

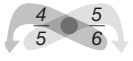
3-1 Rational Numbers (Pages 94–99)

A **rational number** is a number that can be expressed in the form $\frac{a}{b}$, where a and b are integers and b is not equal to 0. A mathematical sentence that uses $<$ and $>$ to compare two expressions is called an **inequality**.

Comparing Rational Numbers	• If the graph of a is to the left of the graph of b on a number line, then $a < b$. • For any two numbers a and b, exactly one of these is true: $a < b$ $\quad$ $a = b$ $\quad$ $a > b$ • You can use **cross products**, the products of diagonal terms, to compare two fractions. For rational numbers $\frac{a}{b}$ and $\frac{c}{d}$, with $b > 0$ and $d > 0$, 1. If $\frac{a}{b} < \frac{c}{d}$, then $ad < bc$, and 2. If $ad < bc$, then $\frac{a}{b} < \frac{c}{d}$.

EXAMPLES

A Replace ● to make $\frac{4}{5}$ ● $\frac{5}{6}$ a true sentence.



Find the cross products.

6(4) ● 5(5)

24 < 25

The true sentence is $\frac{4}{5} < \frac{5}{6}$.

B Write $-\frac{1}{4}$, $-\frac{5}{8}$, and $\frac{2}{9}$ in order from least to greatest.

Express the fractions as terminating or repeating decimals and then order.

$-1 \div 4 = -0.25$ $\quad$ $-5 \div 8 = -0.625$

$2 \div 9 = 0.222\ldots$ or $0.\overline{2}$

The decimals from least to greatest are $-0.625, -0.25, 0.\overline{2}$. So the fractions should be ordered $-\frac{5}{8}, -\frac{1}{4}, \frac{2}{9}$.

PRACTICE

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

1. 4.5 ● -5

2. -2.3 ● -1.8

3. $7 - 25$ ● $-3(2)(3)$

4. $-\frac{3}{4}$ ● $-\frac{6}{7}$

5. $\frac{3}{8}$ ● $\frac{2}{6}$

6. $\frac{3}{5}$ ● $\frac{2}{3}$

Write the numbers in each set from least to greatest.

7. $-\frac{3}{4}, -\frac{5}{6}, -\frac{4}{5}$

8. $-\frac{3}{8}, \frac{3}{5}, -\frac{2}{3}$

9. $0.4, -\frac{3}{7}, -0.1$

10. $\frac{3}{8}, \frac{3}{9}, \frac{5}{6}$

11. $-\frac{1}{7}, -\frac{2}{5}, -0.7$

12. $\frac{1}{3}, \frac{4}{10}, \frac{2}{8}$

13. **Standardized Test Practice** Which number is between $\frac{1}{3}$ and $\frac{4}{5}$?

A $\frac{2}{7}$ **B** $\frac{3}{8}$ **C** $\frac{6}{7}$ **D** $\frac{7}{8}$

Answers: **1.** > **2.** < **3.** = **4.** < **5.** > **6.** < **7.** $-\frac{5}{6}, -\frac{4}{5}, -\frac{3}{4}$ **8.** $-\frac{2}{3}, -\frac{3}{8}, \frac{3}{5}$ **9.** $-\frac{3}{7}, -0.1, 0.4$ **10.** $\frac{3}{9}, \frac{3}{8}, \frac{5}{6}$ **11.** $-0.7, -\frac{2}{5}, -\frac{1}{7}$ **12.** $\frac{2}{8}, \frac{1}{3}, \frac{4}{10}$ **13.** B