Student Guide

Compare Fractions to Benchmarks (SG pp. 82–85)
Questions 1–11

1. **A.** $\frac{3}{8} < \frac{4}{8}$ **B.** $\frac{2}{3} > \frac{1}{2}$

   C. $\frac{3}{4} > \frac{3}{8}$ **D.** $\frac{1}{6} < \frac{2}{3}$

   E. $\frac{1}{4} > \frac{1}{8}$ **F.** $\frac{4}{5} > \frac{1}{2}$

2. **A.** *Answers will vary. Possible responses: $\frac{1}{4}, \frac{1}{3}, \frac{2}{8}$ are less than $\frac{1}{2}$; $\frac{2}{4}, \frac{3}{6}, \frac{4}{8}$ are equal to $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}$, and $\frac{3}{2}$ are greater than $\frac{1}{2}$. A fraction is equal to $\frac{1}{2}$ if its numerator is half its denominator. A fraction is less than or greater than $\frac{1}{2}$ according to whether its numerator is less than or greater than half its denominator.

   B. $\frac{5}{6} > \frac{1}{2}$, $\frac{1}{3} < \frac{1}{2}$, $\frac{3}{2} > \frac{1}{2}$, $\frac{49}{64} > \frac{1}{2}$, $\frac{25}{50} = \frac{1}{2}$, $\frac{20}{15} > \frac{1}{2}$, $\frac{90}{100} > \frac{1}{2}$, $\frac{3}{7} < \frac{1}{2}$, $\frac{15}{15} > \frac{1}{2}$

3. **A.** Answers will vary. Possible responses: $\frac{2}{3}, \frac{3}{4}$, and $\frac{4}{5}$ are less than 1; $\frac{3}{3}, \frac{4}{4}$, and $\frac{5}{5}$ are equal to 1; and $\frac{5}{3}, \frac{7}{4}$, and $\frac{9}{5}$ are greater than 1. A fraction is less than, equal to, or greater than 1 depending on whether its numerator is less than, equal to, or greater than its denominator.

   B. $\frac{5}{6} > 1$, $\frac{1}{3} < 1$, $\frac{3}{2} > 1$, $\frac{49}{64} < 1$, $\frac{25}{50} < 1$, $\frac{20}{15} > 1$, $\frac{90}{100} < 1$, $\frac{3}{7} < 1$, $\frac{15}{15} = 1$

4. **A.**

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{12}, \frac{1}{12}$	$\frac{5}{12},$	$\frac{10}{12}, \frac{11}{12}$	$\frac{25}{12}$

   B. *In fractions near 0, the numerators are much smaller than the denominators.

   In fractions near $\frac{1}{2}$, the numerators are about one-half the denominators.

   In fractions near 1, the numerators are almost the same as the denominators.

   In fractions much greater than 1, the numerators are greater than the denominators.

   C.

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{12}, \frac{1}{12}, \mathbf{\frac{1}{10}, \frac{1}{11}, \frac{2}{10}}$	$\frac{5}{12}, \mathbf{\frac{2}{4}, \frac{6}{10}, \frac{5}{8}}$	$\frac{10}{12}, \frac{11}{12}, \mathbf{\frac{7}{8}}$	$\frac{25}{12}, \mathbf{\frac{24}{6}, \frac{17}{10},}$

   D.

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{12}, \frac{1}{12}, \frac{1}{10}, \frac{1}{11}, \frac{2}{10}, \mathbf{\frac{1}{9}, \frac{3}{20}}$	$\frac{5}{12}, \frac{2}{4}, \frac{6}{10}, \frac{5}{8}, \mathbf{\frac{11}{20}, \frac{20}{40}, \frac{60}{100}}$	$\frac{10}{12}, \frac{11}{12}, \frac{7}{8}, \mathbf{\frac{14}{15}, \frac{103}{100}}$	$\frac{25}{12}, \frac{24}{6}, \frac{17}{10}, \mathbf{\frac{40}{20}}$

Compare Fractions to Benchmarks

We can use number lines to compare fractions. Fractions that are closer to 0 are smaller.

Look at the Halves and Thirds number lines in the *Fractions on Number Lines Chart* in the *Student Guide* Reference section. They show that $\frac{1}{2}$ is less than $\frac{2}{3}$ since $\frac{1}{2}$ is closer to 0.

We can show this with the symbols < for less than and > for greater than:

$$\frac{1}{2} < \frac{2}{3} \text{ means } \frac{1}{2} \text{ is less than } \frac{2}{3}.$$

$$\frac{2}{3} > \frac{1}{2} \text{ means } \frac{2}{3} \text{ is greater than } \frac{1}{2}.$$

Discuss

1. For each pair of fractions, decide which fraction is larger. Use the *Fractions on Number Lines Chart*. Use the symbols < or > to show your answer.

   A. $\frac{3}{8}, \frac{4}{8}$ **B.** $\frac{2}{3}, \frac{1}{2}$

   C. $\frac{3}{4}, \frac{3}{8}$ **D.** $\frac{1}{6}, \frac{2}{3}$

   E. $\frac{1}{4}, \frac{1}{8}$ **F.** $\frac{4}{5}, \frac{1}{2}$

Compare Fractions to $\frac{1}{2}$

2. **A.** Look at the number lines on the *Fractions on Number Lines Chart*. Name several fractions that are less than $\frac{1}{2}$, several that are equal to $\frac{1}{2}$, and several that are greater than $\frac{1}{2}$. Describe a pattern that tells whether a fraction is less than, equal to, or greater than $\frac{1}{2}$.

   B. Compare each of the following fractions to $\frac{1}{2}$. Use the symbols <, >, or = in your answers. Example: $\frac{1}{2} < \frac{5}{8}$

   $$\frac{5}{6}, \frac{1}{3}, \frac{3}{2}, \frac{49}{64}, \frac{25}{50}, \frac{20}{15}, \frac{90}{100}, \frac{3}{7}, \frac{15}{15}$$

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Compare Fractions to 1

3. Here are three number lines from 0 to 2. They show thirds, fourths, and fifths.

   A. Look at the number lines above. Name several fractions that are less than 1, several that are equal to 1, and several that are greater than 1. Describe a pattern that tells whether a fraction is less than, equal to, or greater than 1.

   B. Compare each of the following fractions to 1. Use the symbols <, >, or = in your answers.

   $$\frac{5}{6}, \frac{1}{3}, \frac{3}{2}, \frac{49}{64}, \frac{25}{50}, \frac{20}{15}, \frac{90}{100}, \frac{3}{7}, \frac{15}{15}$$

4. Use the *Sorting Fractions* table in the *Student Activity Book* to sort fractions according to whether they are near or equal to 0, $\frac{1}{2}$, or 1 or much greater than 1. The following fractions are already sorted for you:

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{3}, \frac{2}{12}, \frac{1}{8}$	$\frac{3}{8}, \frac{4}{8}, \frac{3}{5}, \frac{7}{12}, \frac{4}{10}$	$\frac{5}{6}, \frac{8}{8}, \frac{6}{5}$	$\frac{16}{8}, \frac{19}{10}, \frac{25}{5}$

   A. Put the following fractions into the table:

   $$\frac{11}{12}, \frac{0}{12}, \frac{5}{12}, \frac{25}{12}, \frac{1}{12}, \frac{10}{12}.$$

   B. Discuss with a partner: How are the fractions near 0 alike? How are those near $\frac{1}{2}$ alike? Those near 1? Those much greater than 1?

   C. Add these fractions to your table: $\frac{2}{4}, \frac{1}{10}, \frac{24}{6}, \frac{1}{11}, \frac{6}{10}, \frac{5}{8}, \frac{2}{10}, \frac{7}{8}, \frac{17}{10}$

   D. Use your patterns to add these fractions to your table. Most are not on the number line chart:

   $$\frac{14}{15}, \frac{11}{20}, \frac{1}{9}, \frac{103}{100}, \frac{40}{20}, \frac{20}{40}, \frac{3}{20}, \frac{60}{100}.$$

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*Answers and/or discussion are included in the lesson.

Use Benchmarks

When you want to compare fractions, it often helps to first compare them to the benchmarks 0, $\frac{1}{2}$, and 1.

Example: Which is smaller, $\frac{2}{12}$ or $\frac{4}{8}$?

Answer: Since $\frac{2}{12}$ is close to 0 and $\frac{4}{8}$ is equal to $\frac{1}{2}$, $\frac{2}{12}$ is smaller than $\frac{4}{8}$.

We can write $\frac{2}{12} < \frac{4}{8}$.

5. Use benchmarks to decide which fraction is larger. Use the symbols < or > in your answers.

A. $\frac{5}{12}, \frac{1}{10}$ B. $\frac{5}{6}, \frac{9}{8}$ C. $\frac{4}{5}, \frac{3}{6}$ D. $\frac{5}{4}, \frac{0}{2}$

E. $\frac{12}{10}, \frac{10}{12}$ F. $\frac{7}{12}, \frac{1}{6}$ G. $\frac{20}{10}, \frac{1}{20}$ H. $\frac{7}{8}, \frac{3}{5}$

Patterns in Numerators and Denominators

When fractions have the same numerators or the same denominators, it is sometimes easier to compare them. In Questions 6 and 7, you will look for patterns.

6. Put each of the following sets of fractions in order from smallest to largest. Use the symbol for "less than" (<) in your answer. Follow the example:

Example: $\frac{2}{8}, \frac{7}{8}, \frac{5}{8}, \frac{1}{8}$ Answer: $\frac{1}{8} < \frac{2}{8} < \frac{5}{8} < \frac{7}{8}$

A. $\frac{4}{5}, \frac{1}{5}, \frac{6}{5}, \frac{3}{5}$ B. $\frac{11}{12}, \frac{2}{12}, \frac{8}{12}, \frac{7}{12}$

C. If two or more fractions have the same denominator, how can you tell which of the fractions is larger?
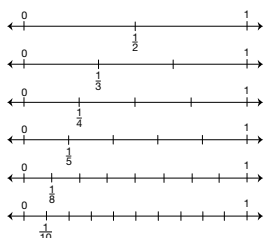
7. Put each of the following sets of fractions in order from smallest to largest.

A. $\frac{1}{3}, \frac{1}{4}, \frac{1}{10}$

B. $\frac{1}{8}, \frac{1}{2}, \frac{1}{5}$

C. $\frac{1}{5}, \frac{1}{10}, \frac{1}{2}$

D. When you compare fractions that have a numerator of 1, how can you tell which is larger?

Compare Fractions to Benchmarks

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8. Put each of the following sets of fractions in order from smallest to largest.

A. $\frac{2}{8}, \frac{2}{3}, \frac{2}{10}$ B. $\frac{3}{8}, \frac{3}{5}, \frac{3}{4}$

C. $\frac{4}{5}, \frac{4}{8}, \frac{4}{2}$

D. When you compare fractions that have the same numerator, how can you tell which is larger?

✓ **Check-In: Questions 9–11**

9. Use what you have learned about benchmark numbers and patterns in denominators and numerators to put each of the following sets of fractions in order from smallest to largest. Use the symbol for less than (<) in your answer.

A. $\frac{7}{12}, \frac{3}{8}, \frac{1}{12}, \frac{10}{10}$ B. $\frac{2}{9}, \frac{12}{11}, \frac{8}{14}, \frac{4}{8}$

C. $\frac{7}{8}, \frac{7}{4}, \frac{7}{11}, \frac{7}{9}$ D. $\frac{9}{6}, \frac{3}{6}, \frac{1}{6}, \frac{5}{6}$

E. $\frac{2}{12}, \frac{20}{10}, \frac{4}{6}, \frac{2}{4}$ F. $\frac{7}{10}, \frac{10}{9}, \frac{1}{10}, \frac{4}{9}$

10. Show or tell how you put the fractions in order in Question 9E.

11. Manny walks $\frac{1}{2}$ mile to school each day, David walks $\frac{2}{3}$ mile to school, and Brandon walks $\frac{1}{4}$ mile.

A. Who has the shortest walk? Explain how you know.

B. Who has the longest walk? Explain how you know.

🏠 **Homework**

Use the strategies you have learned to put the following sets of fractions in order from smallest to largest.

1. $\frac{2}{12}, \frac{2}{3}, \frac{2}{5}, \frac{2}{10}$ **2.** $\frac{7}{8}, \frac{1}{12}, \frac{3}{6}, \frac{13}{5}$

3. $\frac{3}{10}, \frac{7}{10}, \frac{2}{10}, \frac{5}{10}$ **4.** $\frac{11}{12}, \frac{4}{9}, \frac{0}{3}, \frac{1}{3}$

5. $\frac{5}{9}, \frac{5}{4}, \frac{5}{12}, \frac{5}{6}$

6. Show or tell how you can use benchmark numbers to order the fractions in Question 2.

Compare Fractions to Benchmarks

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*Answers and/or discussion are included in the lesson.

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5. A.* $\frac{5}{12} > \frac{1}{10}$ **B.** $\frac{5}{6} < \frac{9}{8}$

C. $\frac{4}{5} > \frac{3}{6}$ **D.** $\frac{5}{4} > \frac{0}{2}$

E. $\frac{12}{10} > \frac{10}{12}$ **F.** $\frac{7}{12} > \frac{1}{6}$

G. $\frac{20}{10} > \frac{1}{20}$ **H.** $\frac{7}{8} > \frac{3}{5}$

6. A. $\frac{1}{5} < \frac{3}{5} < \frac{4}{5} < \frac{6}{5}$

B. $\frac{2}{12} < \frac{7}{12} < \frac{8}{12} < \frac{11}{12}$

C.* The fraction with the larger numerator is the larger fraction.

7. A. $\frac{1}{10} < \frac{1}{4} < \frac{1}{3}$

B. $\frac{1}{8} < \frac{1}{5} < \frac{1}{2}$

C. $\frac{1}{10} < \frac{1}{5} < \frac{1}{2}$

D.* The fraction with the smaller denominator is the larger fraction.

8. A. $\frac{2}{10} < \frac{2}{8} < \frac{2}{3}$ **B.*** $\frac{3}{8} < \frac{3}{5} < \frac{3}{4}$

**C.** $\frac{4}{8} < \frac{4}{5} < \frac{4}{2}$

D.* The fraction with the smaller denominator is the larger fraction.

9. A. $\frac{1}{12} < \frac{3}{8} < \frac{7}{12} < \frac{10}{10}$ **B.** $\frac{2}{9} < \frac{4}{8} < \frac{8}{14} < \frac{12}{11}$

C. $\frac{7}{11} < \frac{7}{9} < \frac{7}{8} < \frac{7}{4}$ **D.** $\frac{1}{6} < \frac{3}{6} < \frac{5}{6} < \frac{9}{6}$

E. $\frac{2}{12} < \frac{2}{4} < \frac{4}{6} < \frac{20}{10}$ **F.** $\frac{1}{10} < \frac{4}{9} < \frac{7}{10} < \frac{10}{9}$

10. Answers will vary. Possible response: I used benchmark numbers. $\frac{2}{12}$ is close to zero so it is the smallest. $\frac{2}{4}$ is equal to $\frac{1}{2}$ and $\frac{4}{6}$ is a little bigger than $\frac{1}{2}$. $\frac{20}{10}$ is equal to 2. So the order is $\frac{2}{12}, \frac{2}{4}, \frac{4}{6}, \frac{20}{10}$.

11. A. Brandon has the shortest walk. Possible response: If you use benchmark numbers, $\frac{1}{4}$ is closest to zero, so his walk will be the shortest of all of the walks.

B. David has the longest walk. Possible response: If you use a number line, $\frac{2}{3}$ is closer to 1 than $\frac{1}{2}$, the length of Manny's walk. So David's walk is longer.
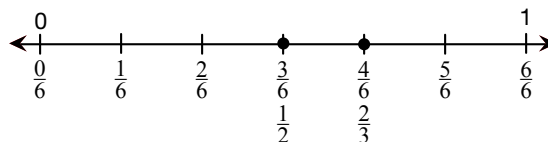
Homework (SG p. 85)
Questions 1–6

Solution strategies will vary for *Questions 1–6.*

1. $\frac{2}{12} < \frac{2}{10} < \frac{2}{5} < \frac{2}{3}$

2. $\frac{1}{12} < \frac{3}{6} < \frac{7}{8} < \frac{13}{5}$

3. $\frac{2}{10} < \frac{3}{10} < \frac{5}{10} < \frac{7}{10}$

4. $\frac{0}{3} < \frac{1}{3} < \frac{4}{9} < \frac{11}{12}$

5. $\frac{5}{12} < \frac{5}{9} < \frac{5}{6} < \frac{5}{4}$

6. Possible response: $\frac{1}{12}$ is very close to zero, so it is the smallest fraction. $\frac{13}{5}$ is more than 2, so it is the largest fraction. $\frac{3}{6}$ is equal to $\frac{1}{2}$ and $\frac{7}{8}$ is almost 1, so $\frac{1}{2}$ is smaller than $\frac{7}{8}$: $\frac{1}{12}$, $\frac{3}{6}$, $\frac{7}{8}$, $\frac{13}{5}$.

Student Activity Book

Use Benchmarks to Sort Fractions (SAB p. 91)
Homework
Questions 1–4

1.

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{4}$	$\frac{5}{8}$, $\frac{5}{10}$	$\frac{5}{5}$, $\frac{11}{10}$	$\frac{24}{12}$

2. Possible response: Since the numerator and denominator are very close (11 and 10), it means that the fraction is very close to one whole or that it is almost equal to 1.

3.

Fractions near or equal to 0	Fractions near or equal to $\frac{1}{2}$	Fractions near or equal to 1	Fractions much greater than 1
$\frac{0}{4}$, $\frac{2}{15}$, $\frac{0}{1}$	$\frac{5}{8}$, $\frac{5}{10}$, $\frac{23}{50}$, $\frac{30}{60}$	$\frac{5}{5}$, $\frac{11}{10}$, $\frac{29}{30}$, $\frac{75}{80}$	$\frac{24}{12}$, $\frac{150}{80}$

4. Possible response: A fraction is close to $\frac{1}{2}$ when the numerator is about half of the denominator. A fraction is equal to $\frac{1}{2}$ when the numerator is exactly half of the denominator. For example, 23 is about half of 50 so $\frac{23}{50}$ is close to $\frac{1}{2}$. 30 is exactly half of 60 so $\frac{30}{60}$ is equal to $\frac{1}{2}$.

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Name _____ Date _____

Comparing Fractions Quiz

Use circle pieces, the *Fractions on Number Lines Chart* in the *Student Guide* Reference section, or your own tools and strategies to compare each pair of fractions below. For each question:
- Circle the larger fraction.
- If the fractions are equivalent, circle them both.
- Show or tell how you made your decision.

1. $\frac{7}{8}$ $\frac{7}{10}$

2. $\frac{3}{6}$ $\frac{1}{6}$

3. $\frac{4}{5}$ $\frac{2}{6}$

4. $\frac{6}{12}$ $\frac{1}{2}$

Assessment Master   **TG · Grade 5 · Unit 2 · Lesson 8** 1

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Name _____ Date _____

5. $\frac{13}{14}$ $\frac{13}{100}$

6. $\frac{10}{16}$ $\frac{5}{8}$

Comparing Fractions Quiz Feedback Box	Expect-ation	Check In	Comments
Compare fractions using area models and number lines.	E6		
• Fractions with the same numerator but different denominator [Q#1, 5]			
• Fractions with the same denominator but different numerators [Q#2]			
• Fractions with different numerators and denominators [Q#3, 4, 6]			
Identify equivalent fractions. [Q#4, 6]	E4		

	Yes . . .	Yes, but . . .	No, but . . .	No . . .
MPE2. Find a strategy. I choose good tools and an efficient strategy for solving the problem.				
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking.				

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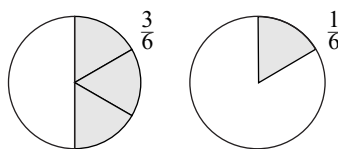

Teacher Guide

Comparing Fractions Quiz (TG pp. 1–2)
Questions 1–6

1. $\boxed{\frac{7}{8}}$ $\frac{7}{10}$

Possible response: I know that eighths are larger than tenths because I'd get more pizza if I shared it with 8 people than 10. So $\frac{7}{8} > \frac{7}{10}$.

2. $\boxed{\frac{3}{6}}$ $\frac{1}{6}$

Possible response:

3. $\boxed{\frac{4}{5}}$ $\frac{2}{6}$

Possible response: I looked at the *Fractions on Number Lines Chart.* $\frac{4}{5}$ is close to 1 whole and $\frac{2}{6}$ is closer to 0. So $\frac{4}{5}$ is larger.

4. $\boxed{\frac{6}{12}}$ $\boxed{\frac{1}{2}}$

These are equal. Responses will vary. Possible response: I looked at the *Fractions on Number Lines Chart* and these fractions are the same distance from zero.

5. $\boxed{\frac{13}{14}}$ $\frac{13}{100}$

Possible response: $\frac{13}{14}$ is almost 1 whole. $\frac{13}{100}$ is a small fraction—a lot less than $\frac{1}{2}$ of 100. Half of 100 would be 50. So $\frac{13}{14}$ is larger.

6. $\boxed{\frac{10}{16}}$ $\boxed{\frac{5}{8}}$

Possible response: These fractions are equal. They cover the same area.