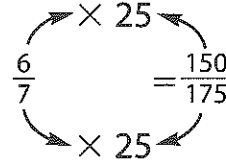
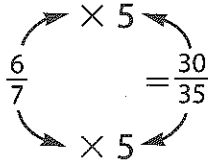
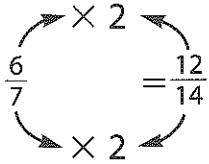


Equivalent Fractions



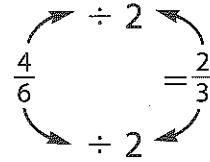
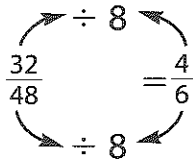
Quick Review

- To find an equivalent fraction with a greater numerator and denominator, multiply the numerator and denominator by the same number.



$\frac{12}{14}$, $\frac{30}{35}$, and $\frac{150}{175}$ are equivalent to $\frac{6}{7}$.

- To find an equivalent fraction with a lesser numerator and denominator, divide the numerator and denominator by the same number.



$\frac{4}{6}$ is equivalent to $\frac{32}{48}$.

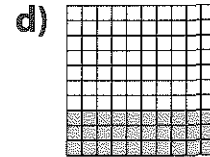
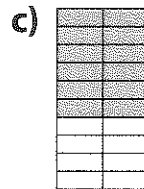
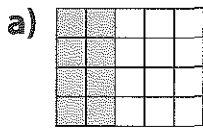
$\frac{2}{3}$ is equivalent to $\frac{4}{6}$ and $\frac{32}{48}$.

$\frac{4}{6}$ is a simpler form of $\frac{32}{48}$.

$\frac{2}{3}$ is the **simplest form** of $\frac{32}{48}$.

Try These

- Write 2 equivalent fractions to represent the shaded part of each picture.



Sample Answers

$\frac{8}{20}$ $\frac{2}{5}$

$\frac{1}{2}$ $\frac{10}{20}$

$\frac{12}{20}$ $\frac{6}{10}$

$\frac{3}{10}$ $\frac{30}{100}$

- Write 2 equivalent fractions to represent the unshaded part of each picture in question 1. **Sample Answers**

a) $\frac{12}{20}$ $\frac{3}{5}$

b) $\frac{1}{2}$ $\frac{10}{20}$

c) $\frac{8}{20}$ $\frac{2}{5}$

d) $\frac{7}{10}$ $\frac{70}{100}$

Practice

1. Multiply to find an equivalent fraction. **Sample Answers**

$$\begin{array}{llll} \text{a) } \frac{5}{6} = \frac{10}{12} & \text{b) } \frac{7}{12} = \frac{21}{36} & \text{c) } \frac{4}{9} = \frac{8}{18} & \text{d) } \frac{3}{8} = \frac{6}{16} \\ \text{e) } \frac{6}{7} = \frac{42}{49} & \text{f) } \frac{2}{3} = \frac{8}{12} & \text{g) } \frac{3}{11} = \frac{24}{88} & \text{h) } \frac{17}{25} = \frac{34}{50} \end{array}$$

2. Divide to find an equivalent fraction. **Sample Answers**

$$\begin{array}{llll} \text{a) } \frac{18}{24} = \frac{9}{12} & \text{b) } \frac{30}{36} = \frac{5}{6} & \text{c) } \frac{125}{175} = \frac{5}{7} & \text{d) } \frac{18}{81} = \frac{2}{9} \\ \text{e) } \frac{21}{49} = \frac{3}{7} & \text{f) } \frac{80}{100} = \frac{4}{5} & \text{g) } \frac{500}{900} = \frac{5}{9} & \text{h) } \frac{30}{54} = \frac{15}{27} \end{array}$$

3. Write 3 equivalent fractions for each fraction. **Sample Answers**

$$\begin{array}{ll} \text{a) } \frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} & \text{b) } \frac{24}{36} = \frac{12}{18} = \frac{6}{9} = \frac{2}{3} \\ \text{c) } \frac{36}{72} = \frac{6}{12} = \frac{3}{6} = \frac{1}{2} & \text{d) } \frac{4}{7} = \frac{8}{14} = \frac{12}{21} = \frac{16}{28} \end{array}$$

4. Write each fraction in simpler form. **Sample Answers**

$$\begin{array}{llll} \text{a) } \frac{9}{12} = \frac{3}{4} & \text{b) } \frac{6}{15} = \frac{2}{5} & \text{c) } \frac{45}{60} = \frac{15}{20} & \text{d) } \frac{36}{48} = \frac{6}{8} \\ \text{e) } \frac{60}{100} = \frac{6}{10} & \text{f) } \frac{45}{54} = \frac{5}{6} & \text{g) } \frac{30}{70} = \frac{15}{35} & \text{h) } \frac{42}{48} = \frac{21}{24} \end{array}$$

5. Write each fraction in simplest form.

$$\begin{array}{llll} \text{a) } \frac{6}{8} = \frac{3}{4} & \text{b) } \frac{49}{56} = \frac{7}{8} & \text{c) } \frac{24}{36} = \frac{2}{3} & \text{d) } \frac{45}{75} = \frac{3}{5} \\ \text{e) } \frac{27}{54} = \frac{1}{2} & \text{f) } \frac{54}{60} = \frac{9}{10} & \text{g) } \frac{8}{9} = \frac{8}{9} & \text{h) } \frac{12}{18} = \frac{2}{3} \end{array}$$

6. Circle the fractions that are in simplest form.

$$\frac{29}{58} \quad \left(\frac{27}{64}\right) \quad \left(\frac{14}{53}\right) \quad \frac{30}{60} \quad \frac{13}{52} \quad \frac{28}{36} \quad \left(\frac{21}{43}\right) \quad \frac{90}{110}$$

Stretch Your Thinking

Use the digits 1, 2, 3, 4, 6, and 8 to make a fraction equivalent to $\frac{1}{2}$.
You must use all of the digits and you can use each digit only once.
Do this in as many ways as you can.

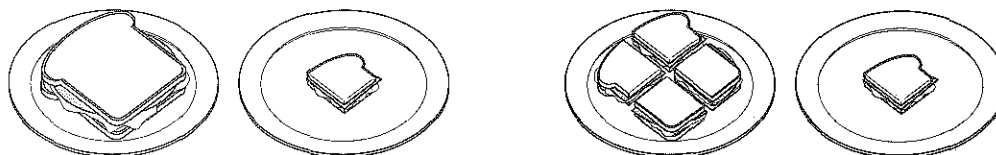
$$\frac{134}{268}, \frac{143}{286}, \frac{218}{436}, \frac{314}{628}, \frac{341}{682}, \frac{416}{832}, \frac{431}{862}$$

Relating Mixed Numbers and Improper Fractions



Quick Review

- These plates have $1\frac{1}{4}$ sandwiches. These plates have $\frac{5}{4}$ sandwiches.



$1\frac{1}{4}$ and $\frac{5}{4}$ represent the same amount.

$1\frac{1}{4}$ is a **mixed number**.

$\frac{5}{4}$ is an **improper fraction**.

- To write $2\frac{7}{8}$ as an improper fraction, multiply the whole number by the denominator and add the numerator.

$$2 \times 8 = 16$$

$$16 + 7 = 23$$

$$\text{So, } \frac{23}{8} = 2\frac{7}{8}$$

- To write $\frac{13}{2}$ as a mixed number, divide the numerator by the denominator.

$$13 \div 2 = 6 \text{ R}1$$

$$\text{So, } 6\frac{1}{2} = \frac{13}{2}$$

Try These

1. Write each mixed number as an improper fraction.

a) $3\frac{7}{9} = \frac{34}{9}$ b) $4\frac{3}{4} = \frac{19}{4}$ c) $7\frac{6}{11} = \frac{83}{11}$ d) $1\frac{19}{20} = \frac{39}{20}$

2. Write each improper fraction as a mixed number.

a) $\frac{8}{5} = 1\frac{3}{5}$ b) $\frac{39}{7} = 5\frac{4}{7}$ c) $\frac{48}{9} = 5\frac{3}{9}$ d) $\frac{16}{3} = 5\frac{1}{3}$

Practice

Play this game with a partner.

You will need 1 number cube, 2 game markers, and 24 small counters.

$1\frac{4}{5}$	$3\frac{6}{7}$	$4\frac{2}{5}$	$6\frac{1}{2}$	$4\frac{3}{4}$	$5\frac{1}{4}$
$9\frac{1}{2}$	<ul style="list-style-type: none"> • Decide who will be player A and who will be player B. • Put your markers on Start. • Take turns to roll the number cube. Move that number of spaces in either direction. • Put a counter on your strip on the improper fraction that names the same amount as the mixed number you landed on. If you can't place a counter on your strip, the other player takes your turn. • The first player to cover the full strip wins. 				$1\frac{3}{7}$
$5\frac{1}{4}$					$2\frac{2}{3}$
$2\frac{2}{3}$					$5\frac{1}{3}$
$5\frac{1}{3}$					$2\frac{3}{8}$
$1\frac{3}{7}$					$1\frac{4}{5}$
$2\frac{7}{8}$					$2\frac{7}{8}$
$4\frac{2}{5}$	$6\frac{1}{2}$	$9\frac{1}{2}$	$3\frac{6}{7}$	$4\frac{3}{4}$	START

Player A	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$
Player B	$\frac{22}{5}$	$\frac{8}{3}$	$\frac{13}{2}$	$\frac{16}{3}$	$\frac{9}{5}$	$\frac{19}{4}$	$\frac{19}{2}$	$\frac{27}{7}$	$\frac{19}{8}$	$\frac{21}{4}$	$\frac{23}{8}$	$\frac{10}{7}$

Stretch Your Thinking

Sadie says she has $\frac{7}{4}$ dollars. How much money does she have? Explain.

Sample Answer: She has \$1.75. One-quarter of one dollar is 25¢.

$$25¢ \times 7 = \$1.75$$

Comparing and Ordering Mixed Numbers and Fractions



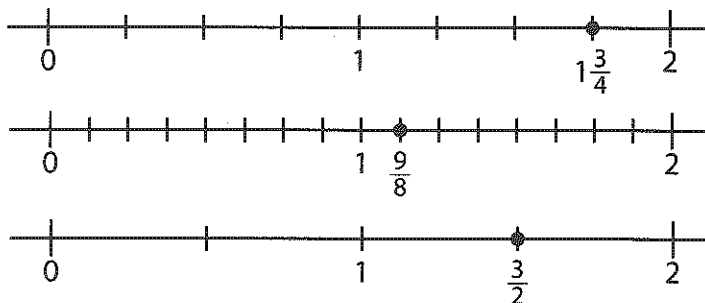
Quick Review

You can compare and order mixed numbers and improper fractions.

- Order $1\frac{3}{4}$, $\frac{9}{8}$, and $\frac{3}{2}$ from least to greatest.

Use number lines.

The order from least to greatest is $\frac{9}{8}$, $\frac{3}{2}$, $1\frac{3}{4}$.



- Compare $3\frac{3}{4}$ and $\frac{17}{12}$.

Write $3\frac{3}{4}$ as an improper fraction: $\frac{15}{4}$

Write $\frac{15}{4}$ as an equivalent fraction with the denominator in twelfths:

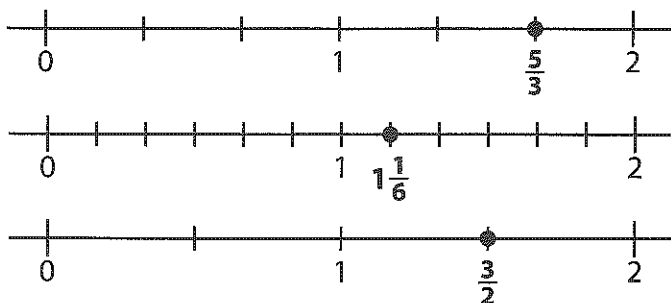
$$\frac{15}{4} = \frac{45}{12}$$

Compare $\frac{45}{12}$ and $\frac{17}{12}$: $\frac{45}{12} > \frac{17}{12}$

So, $3\frac{3}{4} > \frac{17}{12}$

Try These

- Use these number lines to order $\frac{5}{3}$, $1\frac{1}{6}$, and $\frac{3}{2}$ from least to greatest.



The order from least to greatest is $1\frac{1}{6}$, $\frac{3}{2}$, $\frac{5}{3}$.

- Write $>$, $<$, or $=$.

a) $1\frac{7}{8} > \frac{7}{4}$

b) $\frac{21}{5} = 4\frac{1}{5}$

c) $\frac{13}{4} < 3\frac{5}{6}$

Practice

1. Write $>$, $<$, or $=$.

a) $\frac{11}{7} > \frac{10}{9}$

b) $\frac{21}{8} > \frac{31}{12}$

c) $\frac{17}{7} < 2\frac{3}{4}$

d) $1\frac{1}{2} = \frac{24}{16}$

e) $\frac{24}{5} = \frac{48}{10}$

f) $3\frac{4}{5} > \frac{78}{10}$

2. Use a mixed number to complete each question. **Sample Answers**

a) $\frac{9}{4} = 2\frac{1}{4}$

b) $\frac{19}{11} > 1\frac{1}{2}$

c) $\frac{25}{12} < 2\frac{3}{4}$

d) $\frac{41}{3} < 14\frac{1}{5}$

e) $\frac{30}{10} < 3\frac{1}{8}$

f) $\frac{14}{3} > 3\frac{1}{2}$

3. Order the numbers in each set from greatest to least.

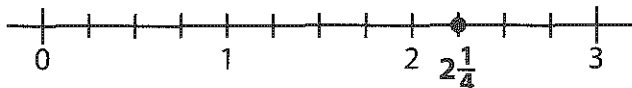
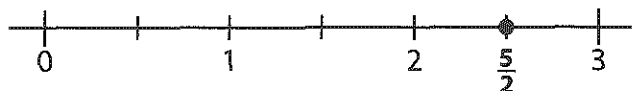
a) $\frac{8}{3}, 1\frac{11}{12}, \frac{7}{4}$ $\frac{8}{3}, 1\frac{11}{12}, \frac{7}{4}$

b) $\frac{10}{6}, \frac{8}{8}, 1\frac{1}{3}$ $\frac{10}{6}, 1\frac{1}{3}, \frac{8}{8}$

c) $\frac{9}{5}, \frac{11}{10}, 1\frac{7}{20}$ $\frac{9}{5}, 1\frac{7}{20}, \frac{11}{10}$

d) $2\frac{8}{12}, \frac{13}{6}, \frac{9}{8}$ $2\frac{8}{12}, \frac{13}{6}, \frac{9}{8}$

4. Use these number lines to order $\frac{5}{2}$, $2\frac{1}{4}$, and $\frac{6}{3}$ from greatest to least.



The order from greatest to least is $\frac{5}{2}, 2\frac{1}{4}, \frac{6}{3}$.

5. Write each time period as a mixed number and as an improper fraction.

Sample Answers

a) 3 h 30 min: $3\frac{1}{2}$ h; $\frac{7}{2}$ h

b) 1 h 20 min: $1\frac{1}{3}$ h; $\frac{4}{3}$ h

c) 2 h 45 min: $2\frac{3}{4}$ h; $\frac{11}{4}$ h

d) 7 h 10 min: $7\frac{1}{6}$ h; $\frac{43}{6}$ h

Stretch Your Thinking

Jeremiah thinks $27\frac{8}{9}$ is equivalent to $\frac{251}{8}$. Is he correct?

Explain how you know.

Sample Answer: Jeremiah is not correct. If you write $27\frac{8}{9}$ as an improper

fraction, the answer is $\frac{251}{9}$, not $\frac{251}{8}$.