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Lesson 4.1 Fractions and Division

Fractions tell how items are divided. When you see a fraction written like this, $\frac{1}{3}$, that means something has been divided into 3 parts and the fraction is one of those parts. The division problem $1 \div 3$, gives the same result.

Read each problem and then answer the questions.

1. If you have 3 pies, and you want to split them between 4 people, how much pie will each person receive?

   Each pie will be cut into _____ pieces.

   Each person will receive _____ of a pie.

2. A 45-pound bag of rice is going to be split between 5 families. How much rice will each family receive?

   The way to write this as a division problem is _____ .

   The way to write this as a fraction is _____ .

   Each family will receive _____ pounds of rice.

3. A group of 3 students has to read a 21-page chapter for homework. How many pages will each student have to read if they are sharing the load?

   The way to write this as a division problem is _____ .

   The way to write this as a fraction is _____ .

   Each student will need to read _____ pages of the chapter.

4. John bought two 5-pound bags of candy to share with his classmates. If there are 25 students in John's class, how much candy will each student receive?

   Each bag of candy will be split _____ ways.

   Each person will receive _____ pounds of candy.

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Lesson 4.2 Changing Improper Fractions to Mixed Numbers

$\frac{13}{6}$ means $13 \div 6$ or $6\overline{)13}$

$$\begin{array}{r} 2\frac{1}{6} \\ 6\overline{)13} \\ -12 \\ \hline 1 \end{array}$$

$1 \rightarrow 1 \div 6 = \frac{1}{6}$

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

$\frac{13}{6}$ is an **improper fraction**, meaning the denominator divides the numerator at least one time. In other words, the numerator is greater than the denominator.

$2\frac{1}{6}$ is a **mixed number**. This is the simplest form of an improper fraction.

Write each improper fraction as a mixed number in simplest form.

	a	b	c
1.	$\frac{5}{3}$ _____	$\frac{7}{6}$ _____	$\frac{9}{5}$ _____
2.	$\frac{3}{2}$ _____	$\frac{4}{3}$ _____	$\frac{8}{5}$ _____
3.	$\frac{7}{5}$ _____	$\frac{9}{7}$ _____	$\frac{5}{4}$ _____
4.	$\frac{32}{6}$ _____	$\frac{51}{4}$ _____	$\frac{49}{9}$ _____
5.	$\frac{66}{5}$ _____	$\frac{83}{3}$ _____	$\frac{28}{5}$ _____
6.	$\frac{29}{3}$ _____	$\frac{28}{7}$ _____	$\frac{64}{6}$ _____

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Lesson 4.3 Changing Mixed Numbers to Improper Fractions

To change a mixed number to a fraction, multiply the denominator by the whole number. Then, add the numerator to the product to get the new numerator. Keep the denominator the same.

$4\frac{3}{5} = \frac{(5 \times 4) + 3}{5} = \frac{20 + 3}{5} = \frac{23}{5}$ $\qquad$ $2\frac{3}{4} = \frac{(4 \times 2) + 3}{4} = \frac{8 + 3}{4} = \frac{11}{4}$

Change each mixed number to an improper fraction.

	a	b	c	d
1.	$2\frac{5}{8}$ _____	$3\frac{1}{4}$ _____	$2\frac{3}{7}$ _____	$4\frac{1}{1}$ _____
2.	$3\frac{3}{4}$ _____	$2\frac{5}{12}$ _____	$4\frac{1}{6}$ _____	$5\frac{2}{3}$ _____
3.	$2\frac{7}{16}$ _____	$3\frac{1}{2}$ _____	$1\frac{7}{16}$ _____	$2\frac{5}{8}$ _____
4.	$3\frac{1}{3}$ _____	$4\frac{2}{5}$ _____	$3\frac{1}{8}$ _____	$7\frac{1}{3}$ _____
5.	$8\frac{2}{3}$ _____	$1\frac{2}{5}$ _____	$2\frac{3}{7}$ _____	$3\frac{8}{9}$ _____
6.	$4\frac{2}{5}$ _____	$3\frac{5}{6}$ _____	$2\frac{4}{9}$ _____	$4\frac{5}{12}$ _____

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Lesson 4.4 Reviewing Factors and Multiples

Greatest Common Factor

Find the greatest common factor by looking for which factors two numbers share and then figure out which is the greatest.

8 – 1, 2, 4, 8
16 – 1, 2, 4, 8, 16
} The greatest common factor is 8

Least Common Multiple

Find the least common multiple by listing multiples of each number until finding the first one that is shared.

3 – 3, 6, 9, 12
4 – 4, 8, 12
} The least common multiple is 12

Find the greatest common factor of these numbers.

	a	b
1.	14 and 42 _____	27 and 18 _____
2.	36 and 24 _____	45 and 20 _____
3.	72 and 54 _____	42 and 49 _____
4.	86 and 94 _____	66 and 11 _____

Find the least common multiple of these numbers.

5.	2 and 7 _____	4 and 10 _____
6.	4 and 5 _____	6 and 10 _____
7.	4 and 12 _____	6 and 18 _____
8.	2 and 5 _____	5 and 11 _____

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Lesson 4.5 Finding Common Denominators

The two fractions $\frac{1}{5}$ and $\frac{3}{5}$ have common denominators. However $\frac{1}{4}$ and $\frac{3}{5}$ do not have common denominators. Rename these fractions so that they have common denominators by finding the least common multiple of their denominators.

Multiples of 4 are 4, 8, 12, 16, 20, 24, . . .

Multiples of 5 are 5, 10, 15, 20, . . .

The smallest number that is a multiple of 4 and 5 is 20.

Rename each fraction with a denominator of 20.

$\frac{1}{4} = \frac{1 \times 5}{4 \times 5} = \frac{5}{20}$; $\frac{3}{5} = \frac{3 \times 4}{5 \times 4} = \frac{12}{20}$

$\frac{5}{20}$ and $\frac{12}{20}$ have common denominators.

Rename each pair of fractions with common denominators.

	a	b	c
1.	$\frac{1}{4}$ and $\frac{2}{3}$ _____	$\frac{3}{8}$ and $\frac{7}{10}$ _____	$\frac{4}{7}$ and $\frac{2}{3}$ _____
2.	$\frac{3}{8}$ and $\frac{1}{6}$ _____	$\frac{2}{3}$ and $\frac{1}{2}$ _____	$\frac{3}{8}$ and $\frac{5}{6}$ _____
3.	$\frac{2}{5}$ and $\frac{1}{3}$ _____	$\frac{5}{16}$ and $\frac{3}{8}$ _____	$\frac{1}{2}$ and $\frac{1}{3}$ _____
4.	$\frac{5}{8}$ and $\frac{3}{16}$ _____	$\frac{2}{5}$ and $\frac{3}{4}$ _____	$\frac{5}{12}$ and $\frac{4}{5}$ _____
5.	$\frac{5}{9}$ and $\frac{1}{2}$ _____	$\frac{7}{8}$ and $\frac{7}{12}$ _____	$\frac{1}{9}$ and $\frac{2}{3}$ _____

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Lesson 4.6 Finding Equivalent Fractions

$8 = \frac{\square}{4}$

$8 = \frac{8}{1}$ Rewrite the whole number as a fraction whose denominator is one.

$\frac{8}{1} \times \frac{4}{4} = \frac{32}{4}$ Multiply the numerator and denominator by the same number.

$8 = \frac{32}{4}$ $\frac{8}{1}$ and $\frac{32}{4}$ are equivalent fractions.

Find the equivalent fraction.

	a	b	c
1.	$\frac{1}{3} = \frac{\square}{6}$	$\frac{3}{5} = \frac{\square}{15}$	$\frac{2}{9} = \frac{\square}{27}$
2.	$\frac{6}{7} = \frac{\square}{14}$	$2 = \frac{\square}{3}$	$5 = \frac{\square}{7}$
3.	$7 = \frac{\square}{5}$	$\frac{5}{8} = \frac{\square}{24}$	$1 = \frac{\square}{6}$
4.	$3 = \frac{\square}{9}$	$\frac{8}{11} = \frac{\square}{33}$	$\frac{5}{6} = \frac{\square}{30}$
5.	$6 = \frac{\square}{3}$	$\frac{7}{9} = \frac{\square}{18}$	$8 = \frac{\square}{6}$

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Lesson 4.7 Simplifying Fractions

$\frac{12}{16} \div \frac{4}{4} = \frac{3}{4}$ $\quad \frac{12}{16} = \frac{3}{4}$

$\frac{36}{72} \div \frac{36}{36} = \frac{1}{2}$ $\quad \frac{36}{72} = \frac{1}{2}$

To reduce a fraction to its simplest form, divide the numerator and denominator by the same number. The fraction is in simplest form when 1 is the only common factor.

Reduce each fraction to simplest form.

	a	b	c
1.	$\frac{3}{6}$ _____	$\frac{5}{10}$ _____	$\frac{9}{18}$ _____
2.	$\frac{6}{24}$ _____	$\frac{4}{12}$ _____	$\frac{2}{10}$ _____
3.	$\frac{4}{20}$ _____	$\frac{12}{15}$ _____	$\frac{8}{32}$ _____
4.	$\frac{18}{36}$ _____	$\frac{26}{28}$ _____	$\frac{17}{68}$ _____
5.	$\frac{25}{35}$ _____	$\frac{51}{75}$ _____	$\frac{28}{36}$ _____
6.	$\frac{22}{64}$ _____	$\frac{49}{63}$ _____	$\frac{24}{96}$ _____

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Lesson 4.8 Simplifying Mixed Numbers

A mixed numeral is in simplest form if its fraction is in simplest form and names a number less than 1.

The greatest common factor of 8 and 12 is 4.

$3\frac{8}{12}$

$3 + \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$

$3\frac{8}{12} = 3\frac{2}{3}$

$2\frac{9}{4} = 2 + \frac{9}{4}$

$2 + (2\frac{1}{4}) = 4\frac{1}{4}$

not in simplest form

Reduce each mixed numeral to simplest form.

	a	b	c	d
1.	$3\frac{6}{8}$ _____	$2\frac{12}{15}$ _____	$1\frac{9}{12}$ _____	$4\frac{10}{15}$ _____
2.	$2\frac{8}{5}$ _____	$3\frac{15}{4}$ _____	$1\frac{7}{3}$ _____	$2\frac{5}{2}$ _____
3.	$4\frac{4}{8}$ _____	$5\frac{6}{9}$ _____	$8\frac{12}{20}$ _____	$7\frac{4}{16}$ _____
4.	$2\frac{10}{4}$ _____	$3\frac{3}{2}$ _____	$7\frac{8}{12}$ _____	$5\frac{3}{9}$ _____
5.	$2\frac{10}{3}$ _____	$4\frac{6}{5}$ _____	$3\frac{15}{7}$ _____	$2\frac{20}{9}$ _____

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Lesson 4.9 Comparing and Ordering Fractions

Use your knowledge of simplifying, finding common denominators, and finding equivalent fractions.

Compare each pair of fractions using <, >, or =.

	a	b	c	d
1.	$\frac{19}{9}$ ___ $\frac{1}{10}$	$1\frac{1}{12}$ ___ $10\frac{1}{3}$	$2\frac{1}{9}$ ___ $10\frac{1}{2}$	$\frac{1}{9}$ ___ $\frac{6}{7}$
2.	$\frac{4}{6}$ ___ $\frac{5}{9}$	$\frac{4}{7}$ ___ $\frac{21}{11}$	$\frac{29}{9}$ ___ $2\frac{1}{6}$	$\frac{26}{11}$ ___ $\frac{22}{11}$
3.	$\frac{20}{8}$ ___ $\frac{12}{8}$	$\frac{4}{9}$ ___ $7\frac{1}{4}$	$2\frac{11}{12}$ ___ $1\frac{1}{5}$	$\frac{4}{2}$ ___ $\frac{29}{9}$
4.	$\frac{2}{2}$ ___ $\frac{1}{3}$	$\frac{1}{3}$ ___ $2\frac{11}{12}$	$5\frac{1}{2}$ ___ $\frac{11}{12}$	$\frac{13}{3}$ ___ $\frac{1}{5}$
5.	$\frac{2}{5}$ ___ $2\frac{3}{8}$	$\frac{20}{11}$ ___ $\frac{25}{2}$	$\frac{1}{7}$ ___ $7\frac{1}{3}$	$\frac{1}{9}$ ___ $\frac{19}{6}$
6.	$3\frac{2}{10}$ ___ $\frac{26}{8}$	$\frac{2}{3}$ ___ $\frac{1}{2}$	$\frac{5}{9}$ ___ $\frac{1}{9}$	$\frac{19}{9}$ ___ $\frac{27}{4}$

Put the fractions in order from least to greatest.

7. $\frac{1}{7}, \frac{6}{7}, 1\frac{2}{3}, 1\frac{8}{9}, 1\frac{1}{7}$

_____

8. $\frac{7}{8}, \frac{4}{7}, 1\frac{1}{2}, \frac{2}{7}, 1\frac{1}{4}$

_____

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

_____

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Lesson 4.10 Changing Fractions to Decimals

Change $\frac{1}{5}$ to tenths.

$\frac{1}{5} = \frac{1 \times 2}{5 \times 2} = \frac{2}{10} = 0.2$

Change $\frac{1}{5}$ to hundredths.

$\frac{1}{5} = \frac{1 \times 20}{5 \times 20} = \frac{20}{100} = 0.20$

Change $\frac{1}{4}$ to hundredths.

$\frac{1}{4} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = 0.25$

Change $\frac{1}{250}$ to thousandths.

$3\frac{1}{250} = 3\frac{1 \times 4}{250 \times 4} = 3\frac{4}{1000} = 3.004$

Change each of the following to a decimal as indicated.

	a	b	c
1.	Change $\frac{2}{5}$ to tenths. _____	Change $\frac{2}{5}$ to hundredths. _____	Change $\frac{2}{5}$ to thousandths. _____
2.	Change $3\frac{1}{2}$ to tenths. _____	Change $\frac{3}{25}$ to hundredths. _____	Change $\frac{17}{25}$ to thousandths. _____
3.	Change $2\frac{3}{5}$ to tenths. _____	Change $\frac{9}{20}$ to hundredths. _____	Change $\frac{29}{250}$ to thousandths. _____
4.	Change $2\frac{1}{5}$ to tenths. _____	Change $\frac{17}{50}$ to hundredths. _____	Change $1\frac{27}{100}$ to thousandths. _____
5.	Change $\frac{4}{5}$ to tenths. _____	Change $\frac{3}{4}$ to hundredths. _____	Change $\frac{3}{40}$ to thousandths. _____
6.	Change $7\frac{1}{2}$ to tenths. _____	Change $2\frac{3}{10}$ to hundredths. _____	Change $\frac{7}{125}$ to thousandths. _____

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Lesson 4.11 Changing Decimals to Fractions

$0.4 = \frac{4}{10} = \frac{2}{5}$

$0.19 = \frac{19}{100}$

$2.35 = 2\frac{35}{100} = 2\frac{7}{20}$

$0.125 = \frac{125}{1000} = \frac{1}{8}$

$3.24 = 3\frac{24}{100} = 3\frac{6}{20}$

Write each decimal as a fraction or mixed number in simplest form.

	a	b	c	d
1.	0.4 _____	0.75 _____	3.1 _____	0.6 _____
2.	0.25 _____	1.3 _____	4.15 _____	2.2 _____
3.	3.125 _____	0.16 _____	8.4 _____	2.5 _____
4.	0.001 _____	0.04 _____	1.6 _____	1.01 _____
5.	0.64 _____	0.70 _____	4.6 _____	0.88 _____
6.	2.42 _____	0.56 _____	0.15 _____	0.002 _____
7.	2.3 _____	3.9 _____	1.95 _____	0.442 _____
8.	1.86 _____	3.31 _____	0.96 _____	0.12 _____
9.	4.76 _____	3.89 _____	4.08 _____	0.55 _____