NAME_____ DATE _____

Flags and Fractions
Modeling Parts of a Whole

Vocabulary

Choose the term from the box that best completes each statement.

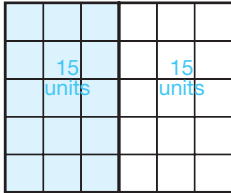| fraction	numerator	denominator

1. A _____ represents a part of a whole object, set, or unit.

2. The number below the bar in a fraction is the _____.

3. In a fraction, the _____ represents the number of parts of the whole.

4. In a fraction, the _____ represents how many parts make the whole.

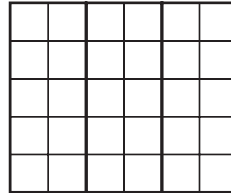**5.** The number above the bar in a fraction is the _____.

Problem Set

Shade each grid into equal parts. Determine the number of units in each part.
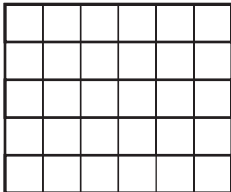
1. Shade the grid into equal halves.

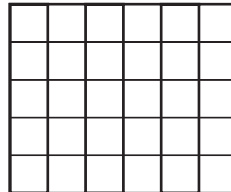|					
15 units			15 units		

Each half must contain 15 units.

Grid shading answers will vary.
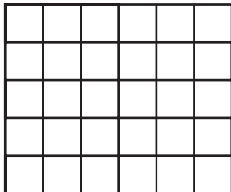
2. Shade the grid into equal thirds.

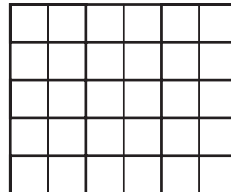**3.** Shade the grid into equal fifths.
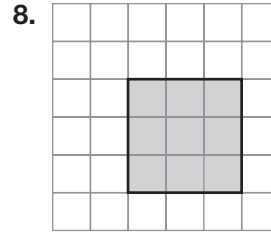
4. Shade the grid into equal sixths.

5. Shade the grid into equal tenths.

6. Shade the grid into equal fifteenths.

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Determine the fraction represented by the shaded part of each grid.

7.
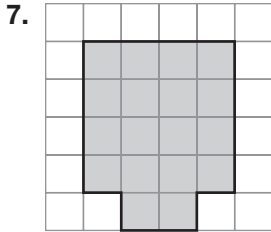
The shaded part is $\dfrac{18}{36}$ of the grid.

8.

9.

10.

11.

12.
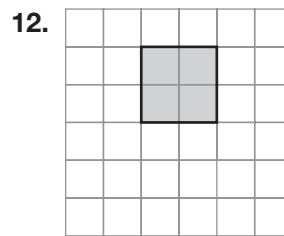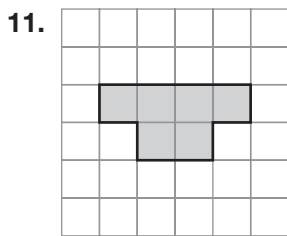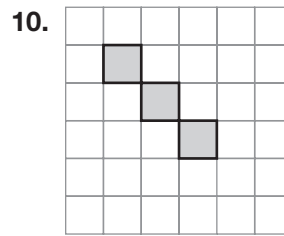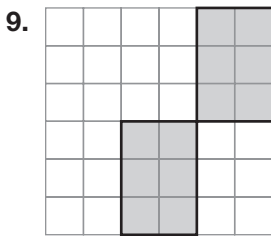
Each grid has been shaded into equal parts. Determine the number of units in each part.
Determine the fraction represented by one part.

13.

9 units

9 units   9 units

9 units
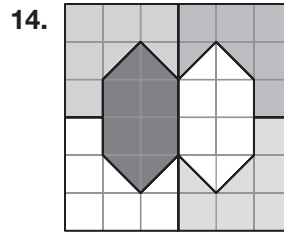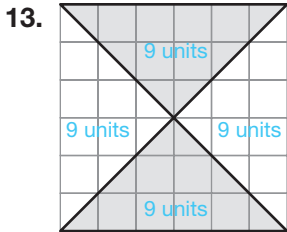
Each part is $\frac{9}{36}$ of the grid.

14.

15.

16.

17.

18.
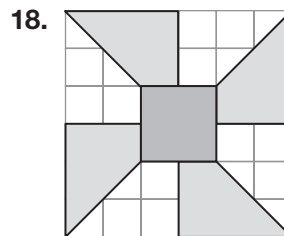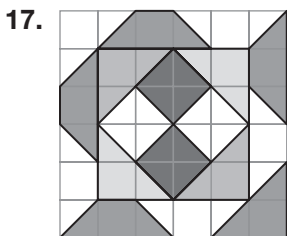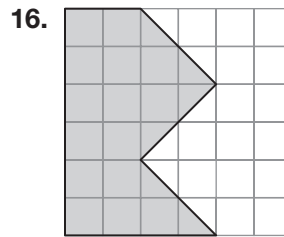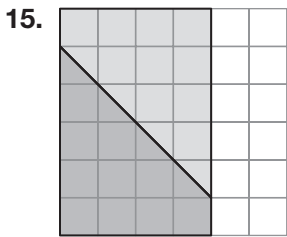
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Emilio is organizing his family's DVD collection. The collection contains the following DVDs.

- 12 action movies
- 6 comedy movies
- 8 drama movies
- 7 science fiction movies
- 15 animated movies
- 2 musical movies

19. What fraction of the movies are action movies?

The total number of movies is 50.

Action movies are $\frac{12}{50}$ of the collection of movies.

20. What fraction of the movies are drama movies?

21. What fraction of the movies are animated movies?

22. What fraction of the movies are comedy movies?

23. What fraction of the movies are science fiction movies?

24. What fraction of the movies are musical movies?

Olivia is organizing her family's collection of books. The collection contains the following books.

- 8 biographies
- 7 mysteries
- 5 cookbooks
- 19 comics
- 25 children's books
- 12 romance novels

25. What fraction of the books are biographies?

The total number of books is 76.

Biographies are $\frac{8}{76}$ of the collection of books.

26. What fraction of the books are mysteries?

27. What fraction of the books are cookbooks?

28. What fraction of the books are comics?

29. What fraction of the books are children's books?

30. What fraction of the books are romance novels?

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You Mean Three Can Be One?
Fractional Representations

Problem Set

Divide each set of shapes into equal portions. Then, identify the fraction represented by each portion.

1. Divide the set of circles into 5 equal portions.
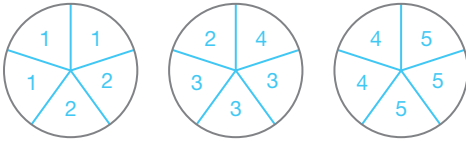
Each portion is $\frac{3}{5}$ of a circle.

2. Divide the set of circles into 2 equal portions.
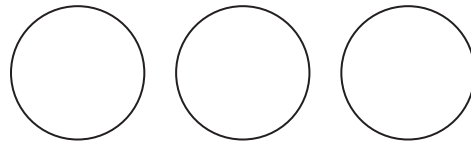
3. Divide the set of circles into 6 equal portions.
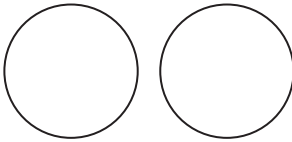
4. Divide the set of squares into 4 equal portions.

5. Divide the set of squares into 5 equal portions.
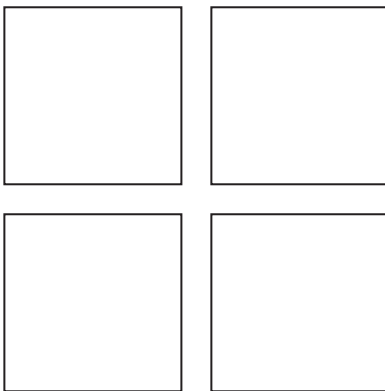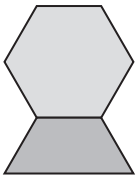
6. Divide the set of squares into 3 equal portions.
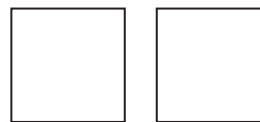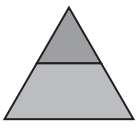
Complete each of the following statements using pattern blocks.

7. If ⬡⬢ = 1, then

⬡ = $\dfrac{2}{3}$,

▲ = $\dfrac{1}{9}$,
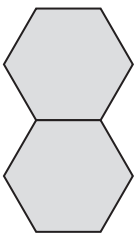
⬤ = $\dfrac{1}{3}$,

8. If △ = 1, then

⬡ = ____

▲ = ____

⬤ = ____

9. If ⬡⬡ = 1, then

⬡ = ____

▲ = ____

⬤ = ____
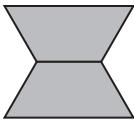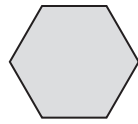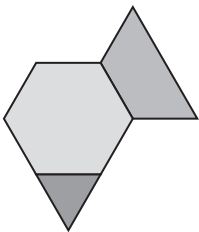
NAME_____ DATE _____
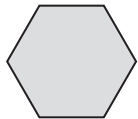
10. If ⬡ = 1, then

⬡ = _____

△ = _____

⬡ = _____
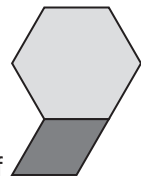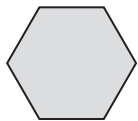
11. If = 1, then

⬡ = _____

△ = _____

⬡ = _____

12. If = 1, then

⬡ = _____

△ = _____

⬡ = _____

Create rectangles for the given fractions using color tiles. Draw your solution.

13. $\frac{1}{4}$ yellow and $\frac{3}{4}$ red

Y	R
R	R

14. $\frac{1}{2}$ red, $\frac{1}{4}$ blue, and $\frac{1}{4}$ yellow

15. $\frac{1}{3}$ red, $\frac{1}{6}$ blue, $\frac{1}{6}$ green, and $\frac{1}{3}$ yellow
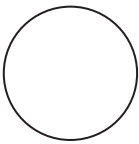
16. $\frac{2}{3}$ blue, $\frac{1}{6}$ red, and $\frac{1}{6}$ green

17. $\frac{3}{4}$ yellow, $\frac{1}{8}$ red, and $\frac{1}{8}$ green
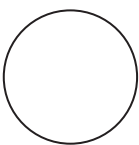
18. $\frac{5}{8}$ green, $\frac{1}{4}$ red, and $\frac{1}{8}$ blue

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Determine each fractional representation. Draw your solution.

19. If ( ) = 1, what is $\frac{2}{3}$?

20. If ( ) = 2, what is 1?

21. If ⊢————⊣ = 1, what is $\frac{3}{5}$?

22. If ⊢————⊣ = $\dfrac{3}{4}$, what is 1?

23. If [＿＿＿] = 1, what is $\dfrac{3}{2}$?

3

24. If [＿] = $\dfrac{1}{4}$, what is 1?

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Rocket Strips
Dividing a Whole Into Fractional Parts

Vocabulary

Match each definition to its corresponding term.

1. a fraction that has a numerator of 1 and a denominator that is a positive integer

    a. unit fraction

2. fractions that represent the same part-to-whole relationship

    b. equivalent fractions

Problem Set

Divide the strips into equal parts and shade to show that the given fractions are equivalent.

1. Show that $\frac{1}{2}$ is equivalent to $\frac{2}{4}$.
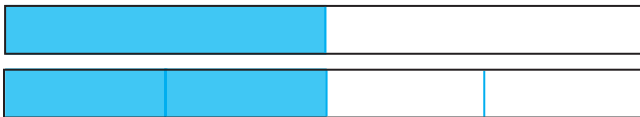
2. Show that $\frac{2}{3}$ is equivalent to $\frac{6}{9}$.

3. Show that $\frac{1}{4}$ is equivalent to $\frac{2}{8}$.
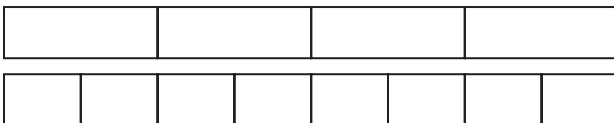
4. Show that $\frac{1}{3}$ is equivalent to $\frac{2}{6}$.

Divide the strips into equal parts and shade to determine the equivalent fraction.

5. Show that $\frac{1}{2}$ is equivalent to $\frac{}{6}$.

$\frac{1}{2}$ is equivalent to $\frac{3}{6}$.

6. Show that $\frac{1}{3}$ is equivalent to $\frac{}{9}$.
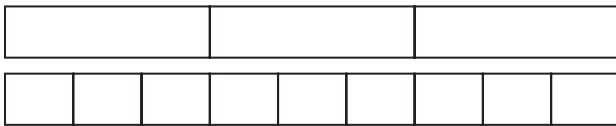
7. Show that $\frac{3}{5}$ is equivalent to $\frac{}{10}$.
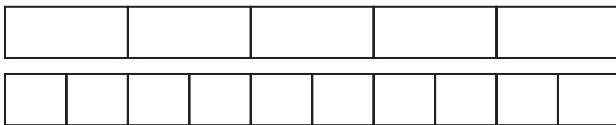
8. Show that $\frac{2}{3}$ is equivalent to $\frac{}{6}$.
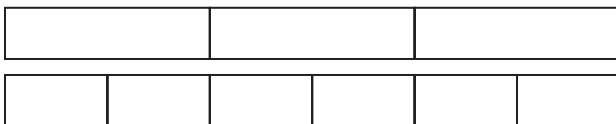
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Getting Closer
Benchmark Fractions

Vocabulary

Write a definition for each term in your own words.

1. benchmark fractions

2. inequality

Problem Set

Label the given number line to represent the fractional part provided and plot each fraction.

1. Divide the number line into halves. Plot $\frac{1}{2}$.
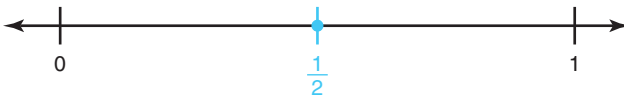
2. Divide the number line into sixths. Plot $\frac{2}{6}$ and $\frac{5}{6}$.
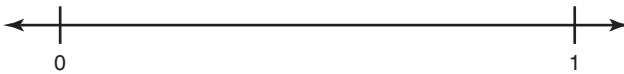
3. Divide the number line into thirds. Plot $\frac{1}{3}$ and $\frac{2}{3}$.

4. Divide the number line into fifths. Plot $\frac{1}{5}$ and $\frac{3}{5}$.
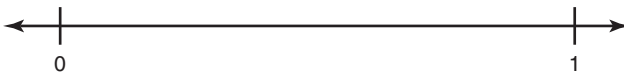
5. Divide the number line into ninths. Plot $\frac{3}{9}$, $\frac{6}{9}$, and $\frac{8}{9}$.

6. Divide the number line into tenths. Plot $\frac{2}{10}$, $\frac{3}{10}$, $\frac{5}{10}$, and $\frac{9}{10}$.
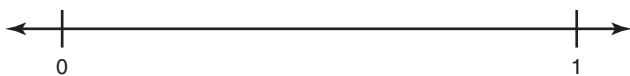
```
  ←——————|———————————————————————————————————|——————→
         0                                    1
```

Fill in the missing numerator or denominator so that each fraction is close to but less than $\frac{1}{2}$.

7. $\frac{8}{17}$

8. $\frac{4}{}$

9. $\frac{12}{}$

10. $\frac{}{7}$

11. $\frac{}{5}$

12. $\frac{9}{}$

Fill in the missing numerator or denominator so that each fraction is close to but less than 1.

13. $\frac{14}{15}$

14. $\frac{4}{}$

15. $\frac{8}{}$

16. $\frac{}{11}$

17. $\frac{}{13}$

18. $\frac{22}{}$

Name the closest benchmark fraction to each given fraction.

19. $\frac{7}{8}$

The closest benchmark fraction is 1.

20. $\frac{1}{9}$

21. $\frac{5}{12}$

22. $\frac{16}{18}$

23. $\frac{2}{15}$

24. $\frac{3}{5}$

25. $\frac{13}{14}$

26. $\frac{5}{9}$

27. $\frac{3}{61}$

28. $\frac{23}{51}$

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Estimate each sum.

29. $\dfrac{2}{5} + \dfrac{7}{8}$

$\dfrac{2}{5} + \dfrac{7}{8} \approx \dfrac{1}{2} + 1$

$= 1\dfrac{1}{2}$

30. $\dfrac{14}{15} + \dfrac{8}{9}$

31. $\dfrac{6}{14} + \dfrac{5}{11}$

32. $\dfrac{9}{17} + \dfrac{2}{35}$

33. $\dfrac{7}{15} + \dfrac{21}{23}$

34. $\dfrac{9}{72} + \dfrac{23}{50}$

35. $\dfrac{2}{41} + \dfrac{12}{13}$

36. $\dfrac{6}{7} + \dfrac{11}{12} + \dfrac{4}{9}$

37. $\dfrac{7}{15} + \dfrac{8}{14} + \dfrac{3}{7}$

38. $\dfrac{11}{23} + \dfrac{13}{14} + \dfrac{9}{10} + \dfrac{2}{25}$

Compare the fractions in each pair using benchmark fractions.
Insert a $<$ or $>$ symbol.

39. $\dfrac{4}{7}$ _____ $\dfrac{8}{9}$

$\dfrac{4}{7} \approx \dfrac{1}{2}$ and $\dfrac{8}{9} \approx 1$

Because $\dfrac{1}{2} < 1$, I know $\dfrac{4}{7} < \dfrac{8}{9}$.

40. $\dfrac{15}{16}$ _____ $\dfrac{7}{13}$

41. $\dfrac{2}{51}$ —— $\dfrac{18}{37}$

42. $\dfrac{7}{15}$ —— $\dfrac{1}{17}$

43. $\dfrac{7}{81}$ —— $\dfrac{15}{16}$

44. $\dfrac{9}{11}$ —— $\dfrac{8}{15}$

3

Order the fractions from least to greatest. Explain your reasoning.

45. $\dfrac{5}{11}, \dfrac{5}{6}, \dfrac{5}{13}, \dfrac{5}{3}, \dfrac{5}{17}, \dfrac{5}{8}$

Because these fractions all have the same numerator, order the denominators so that the fractions range from least (largest denominator) to greatest (smallest denominator).

$\dfrac{5}{17}, \dfrac{5}{13}, \dfrac{5}{11}, \dfrac{5}{8}, \dfrac{5}{6}, \dfrac{5}{3}$

46. $\dfrac{7}{5}, \dfrac{7}{15}, \dfrac{7}{4}, \dfrac{7}{22}, \dfrac{7}{9}, \dfrac{7}{12}$

47. $\dfrac{24}{25}, \dfrac{3}{6}, \dfrac{5}{11}, \dfrac{1}{16}, \dfrac{3}{5}$

48. $\dfrac{5}{10}, \dfrac{2}{21}, \dfrac{7}{13}, \dfrac{6}{7}, \dfrac{8}{17}$

49. $\dfrac{4}{7}, \dfrac{7}{15}, \dfrac{8}{9}, \dfrac{2}{19}$

50. $\dfrac{5}{9}, \dfrac{6}{13}, \dfrac{11}{13}, \dfrac{3}{28}$

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What's My Cut?
Equivalent Fractions

Vocabulary

Match each definition to its corresponding term.

1. state in which the numerator and denominator of a fraction have no common factors by which they can be divided

    a. Multiplicative Identity Property

2. states that $a \times 1 = a$, where a is a nonzero number

    b. simplest form

Problem Set

Complete each equation to make the fractions equivalent.

1. $\dfrac{1}{2} = \dfrac{}{16}$

    $\dfrac{1}{2} \times \dfrac{8}{8} = \dfrac{8}{16}$

2. $\dfrac{3}{4} = \dfrac{9}{}$

3. $\dfrac{6}{9} = \dfrac{}{3}$

4. $\dfrac{6}{15} = \dfrac{2}{}$

5. $\dfrac{12}{32} = \dfrac{}{8}$

6. $\dfrac{1}{4} = \dfrac{}{24}$

7. $\dfrac{1}{3} = \dfrac{8}{}$

8. $\dfrac{14}{16} = \dfrac{7}{}$

Write each fraction in simplest form.

9. $\dfrac{18}{21}$

    $\dfrac{18}{21} \div \dfrac{3}{3} = \dfrac{6}{7}$

10. $\dfrac{20}{28}$

11. $\dfrac{8}{18}$ **12.** $\dfrac{12}{30}$

13. $\dfrac{6}{16}$ **14.** $\dfrac{6}{33}$

Simplify each fraction using prime factorization.

15. $\dfrac{20}{25}$ **16.** $\dfrac{12}{18}$

$$\dfrac{20}{25} = \dfrac{2 \cdot 2 \cdot \cancel{5}}{5 \cdot \cancel{5}}$$

$$= \dfrac{4}{5}$$

17. $\dfrac{45}{72}$ **18.** $\dfrac{42}{54}$

19. $\dfrac{6}{15}$ **20.** $\dfrac{21}{24}$

Simplify each fraction using the greatest common factor.

21. $\dfrac{18}{24}$ **22.** $\dfrac{32}{40}$

Factors of 18: 1, 2, 3, 6, 9, 18

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

GCF = 6

$$\dfrac{18}{24} \div \dfrac{6}{6} = \dfrac{3}{4}$$

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23. $\dfrac{20}{36}$

24. $\dfrac{14}{21}$

25. $\dfrac{10}{35}$

26. $\dfrac{48}{54}$

Order the fractions from least to greatest.

27. $\dfrac{12}{8}, \dfrac{3}{12}, \dfrac{20}{16}, \dfrac{6}{8}, \dfrac{1}{2}$

Rewrite the fractions with a common denominator:

$\dfrac{12}{8} \div \dfrac{2}{2} = \dfrac{6}{4},\quad \dfrac{3}{12} \div \dfrac{3}{3} = \dfrac{1}{4},\quad \dfrac{20}{16} \div \dfrac{4}{4} = \dfrac{5}{4},\quad \dfrac{6}{8} \div \dfrac{2}{2} = \dfrac{3}{4},\quad \dfrac{1}{2} \times \dfrac{2}{2} = \dfrac{2}{4}$

Order the fractions with a common denominator from least to greatest:

$\dfrac{1}{4}, \dfrac{2}{4}, \dfrac{3}{4}, \dfrac{5}{4}, \dfrac{6}{4}$

Write the corresponding original fractions from least to greatest:

$\dfrac{3}{12}, \dfrac{1}{2}, \dfrac{6}{8}, \dfrac{20}{16}, \dfrac{12}{8}$

28. $\dfrac{12}{15}, \dfrac{12}{20}, \dfrac{48}{30}, \dfrac{49}{35}, \dfrac{6}{15}$

29. $\dfrac{20}{15}, \dfrac{4}{6}, \dfrac{5}{15}, \dfrac{32}{12}, \dfrac{21}{9}$

3

30. $\dfrac{1}{2}, \dfrac{12}{32}, \dfrac{1}{4}, \dfrac{10}{16}, \dfrac{3}{24}$

31. $\dfrac{24}{20}, \dfrac{3}{5}, \dfrac{36}{40}, \dfrac{3}{30}, \dfrac{1}{5}$

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32. $\frac{2}{3}, \frac{1}{2}, \frac{3}{4}, \frac{2}{24}, \frac{1}{4}$

3

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Trail Mix
Adding and Subtracting Fractions with Like
and Unlike Denominators

Vocabulary

Choose the term from the box that best completes each statement.

common denominator	least common denominator

1. Two or more fractions have a _____ if the denominators in each fraction are the same.

2. The _____ is the least common multiple of the denominators.

3. A _____ is a whole number that is a common multiple of the denominators of two or more fractions.

Problem Set

Complete each addition sentence using fraction strips. Use at least one fraction with a different denominator for each.

1. $1 = \frac{1}{4} +$ _____

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

Answers will vary.

2. $1 = \frac{1}{8} +$ _____

3. $1 = \frac{1}{3} +$ _____

4. $1 = \frac{3}{12} +$ _____

5. $1 = \frac{1}{16} +$ _____

6. $1 = \frac{2}{6} +$ _____

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Rewrite each addition sentence so that the fractions have a common denominator. Then, determine if the addition sentence is true or false.

7. $1 = \frac{1}{3} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

$1 = \frac{1}{3} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

$1 = \frac{2}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$

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

The addition sentence is true.

8. $1 = \frac{2}{12} + \frac{2}{4} + \frac{1}{6} + \frac{1}{6}$

9. $1 = \frac{1}{6} + \frac{1}{4} + \frac{1}{4} + \frac{1}{2}$

10. $1 = \frac{1}{8} + \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$

11. $1 = \frac{3}{12} + \frac{2}{6} + \frac{1}{3} + \frac{1}{12}$

12. $1 = \frac{3}{8} + \frac{2}{4} + \frac{1}{2}$

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Sketch the fraction-strip representation of each problem.
Then, calculate each sum.

13. $\frac{1}{4} + \frac{3}{8}$

$\frac{1}{4}$		$\frac{3}{8}$				
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$		

$\frac{5}{8}$
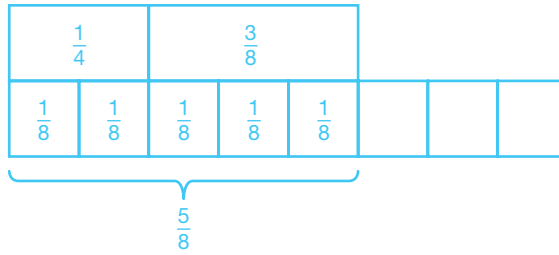
$$\frac{1}{4} = \frac{2}{8}$$
$$+\frac{3}{8} = \frac{3}{8}$$
$$\overline{\phantom{+\frac{3}{8}=}\frac{5}{8}}$$

14. $\frac{1}{2} + \frac{1}{4}$

15. $\dfrac{1}{4} + \dfrac{5}{6}$

3

16. $\dfrac{2}{3} + \dfrac{1}{4}$

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17. $\dfrac{1}{2} + \dfrac{1}{3}$

18. $\dfrac{5}{8} + \dfrac{3}{4}$

Sketch the fraction-strip representation of each problem.
Then, calculate each difference.

19. $\dfrac{5}{6} - \dfrac{1}{3}$

$\dfrac{5}{6}$				

$\dfrac{1}{3}$			

$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$

$$\dfrac{3}{6}$$
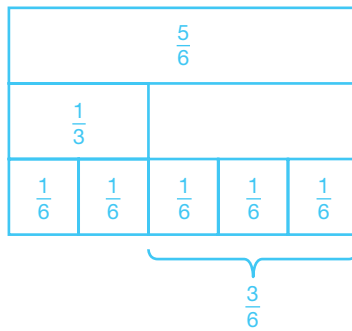
$$
\begin{array}{r}
\dfrac{5}{6} = \dfrac{5}{6} \\[4pt]
-\dfrac{1}{3} = \dfrac{2}{6} \\[2pt]
\hline
\dfrac{3}{6} = \dfrac{1}{2}
\end{array}
$$

20. $\dfrac{7}{8} - \dfrac{1}{4}$

3

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21. $\dfrac{3}{4} - \dfrac{1}{2}$

22. $\dfrac{9}{12} - \dfrac{1}{4}$

3

23. $\frac{5}{8} - \frac{1}{2}$

24. $\frac{2}{3} - \frac{1}{2}$

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Determine the least common denominator for the fractions in each problem. Then, calculate each sum or difference.

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

LCD = 6

$$\frac{1}{6} = \frac{1}{6}$$
$$+\frac{2}{3} = \frac{4}{6}$$
$$\frac{5}{6}$$

26. $\frac{7}{8} - \frac{1}{4}$

27. $\frac{9}{10} - \frac{1}{6}$

28. $\frac{7}{12} + \frac{1}{4}$

29. $\frac{3}{8} + \frac{1}{6}$

30. $\frac{7}{12} - \frac{3}{8}$

3

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Trail Mix Extravaganza
Improper Fractions and Mixed Numbers

Vocabulary

Write a definition for each term in your own words.

1. mixed number

2. improper fraction

Problem Set

Write each improper fraction as a mixed number. Simplify if necessary.

1. $\dfrac{15}{6}$

$$\begin{array}{r} 2 \\ 6\overline{)15} \\ -12 \\ \hline 3 \end{array}$$

$2\dfrac{3}{6} = 2\dfrac{1}{2}$

2. $\dfrac{29}{5}$

3. $\dfrac{19}{7}$

4. $\dfrac{44}{6}$

5. $\dfrac{38}{4}$

6. $\dfrac{17}{3}$

Draw a model to represent each mixed number.

7. $1\frac{2}{3}$

$\frac{3}{3}$
$\frac{2}{3}$
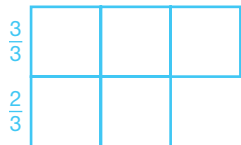
8. $3\frac{1}{4}$

3

9. $2\frac{5}{7}$

10. $4\frac{1}{2}$

11. $2\frac{2}{5}$

12. $3\frac{1}{6}$

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Calculate each sum and simplify.

13. $\dfrac{3}{5} + \dfrac{2}{3}$

$$\dfrac{3}{5} = \dfrac{9}{15}$$
$$+\dfrac{2}{3} = \dfrac{10}{15}$$
$$\dfrac{19}{15} = 1\dfrac{4}{15}$$

14. $\dfrac{1}{3} + \dfrac{3}{4}$

15. $\dfrac{7}{9} + \dfrac{2}{3}$

16. $\dfrac{5}{6} + \dfrac{3}{4}$

17. $\dfrac{2}{5} + \dfrac{8}{9}$

18. $\dfrac{7}{8} + \dfrac{1}{4}$

Write each mixed number as an improper fraction.

19. $3\dfrac{1}{4}$

$$(3 \times 4) + 1 = 13$$
$$\dfrac{13}{4}$$

20. $2\dfrac{4}{5}$

21. $5\dfrac{3}{7}$

22. $2\dfrac{1}{3}$

23. $4\dfrac{5}{8}$

24. $1\dfrac{8}{9}$

Calculate each sum and simplify.

25. $2\frac{1}{4} + 1\frac{3}{8}$

$$2\frac{1}{4} = 2\frac{2}{8}$$
$$+1\frac{3}{8} = 1\frac{3}{8}$$
$$\overline{\phantom{+1\frac{3}{8} = }\,3\frac{5}{8}}$$

26. $5\frac{1}{6} + 3\frac{1}{4}$

27. $1\frac{2}{5} + 4\frac{1}{2}$

28. $3\frac{4}{9} + 2\frac{2}{3}$

29. $2\frac{5}{6} + 4\frac{3}{8}$

30. $1\frac{3}{4} + 3\frac{2}{3}$

Complete each equation to make the mixed numbers equivalent.

31. $4\frac{2}{3} = 3\frac{}{3}$

$$4\frac{2}{3} = 3\frac{2}{3} + \frac{3}{3}$$
$$= 3\frac{5}{3}$$

32. $2\frac{4}{7} = 1\frac{}{7}$

33. $1\frac{5}{6} = \frac{}{6}$

34. $5\frac{7}{12} = 4\frac{}{12}$

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35. $3\dfrac{1}{4} = 2\dfrac{}{4}$

36. $6\dfrac{7}{8} = 5\dfrac{}{8}$

Calculate each difference and simplify.

37. $3\dfrac{1}{4} - 1\dfrac{5}{8}$

$$3\dfrac{1}{4} = 3\dfrac{2}{8} = 2\dfrac{10}{8}$$
$$-1\dfrac{5}{8} = 1\dfrac{5}{8} = 1\dfrac{5}{8}$$
$$\rule{3cm}{0.4pt}$$
$$1\dfrac{5}{8}$$

38. $5\dfrac{1}{2} - 2\dfrac{5}{6}$

39. $6\dfrac{3}{8} - 3\dfrac{4}{5}$

40. $7\dfrac{1}{6} - 4\dfrac{2}{3}$

41. $4\dfrac{2}{7} - 1\dfrac{3}{4}$

42. $9\dfrac{1}{3} - 5\dfrac{3}{5}$

3

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Pizzas by the Slice–or the Rectangle!
Parts of Parts

Problem Set

Represent each product using an area model. Then calculate the product.

1. $\dfrac{3}{4} \times \dfrac{1}{3}$
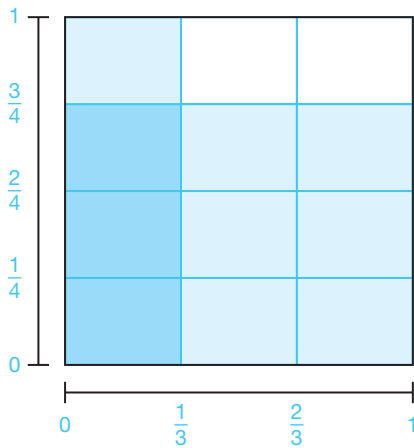
$$\dfrac{3}{4} \times \dfrac{1}{3} = \dfrac{3}{12}$$
$$= \dfrac{1}{4}$$

2. $\dfrac{1}{2} \times \dfrac{3}{5}$

3. $\frac{1}{6} \times \frac{2}{3}$
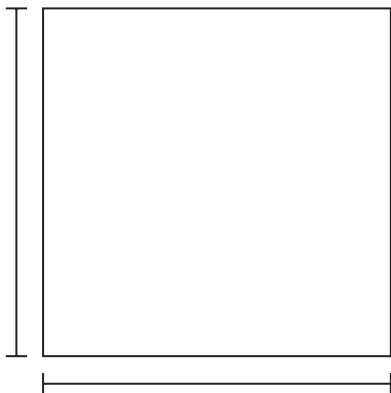
4. $\frac{1}{3} \times \frac{4}{5}$
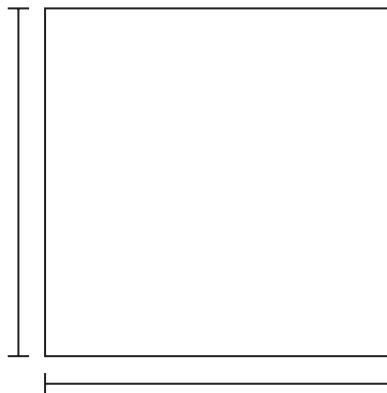
5. $\frac{1}{4} \times \frac{1}{3}$
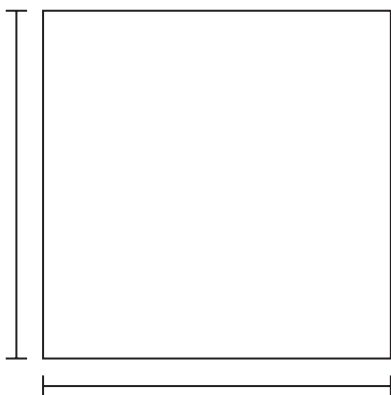
6. $\frac{1}{2} \times \frac{5}{6}$
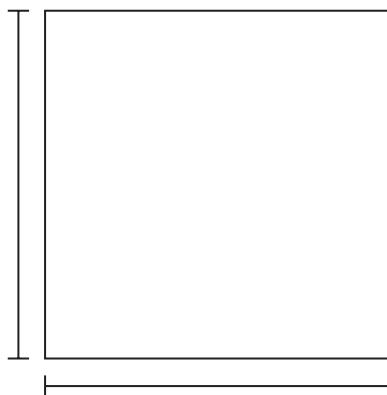
NAME_____ DATE _____

Calculate each product. Simplify if necessary.

7. $\frac{3}{5} \times \frac{4}{7}$

$\frac{3}{5} \times \frac{4}{7} = \frac{12}{35}$

8. $\frac{2}{9} \times \frac{1}{4}$

9. $\frac{2}{5} \times \frac{10}{13}$

10. $\frac{5}{8} \times \frac{1}{2}$

11. $\frac{3}{7} \times \frac{4}{5}$

12. $\frac{3}{4} \times \frac{1}{12}$

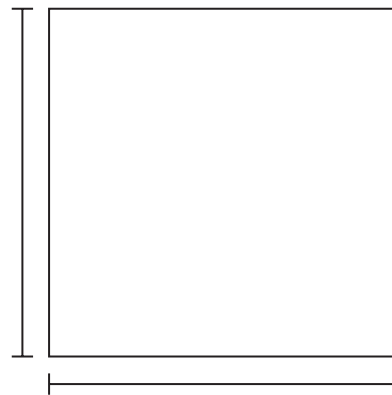**13.** $\frac{2}{3} \times \frac{4}{9}$

14. $\frac{1}{6} \times \frac{12}{13}$

Use benchmark fractions to estimate each product.

15. $2\frac{5}{6} \times 3\frac{1}{8}$

$\frac{5}{6} \approx 1$, so $2\frac{5}{6} \approx 3$

$\frac{1}{8} \approx 0$, so $3\frac{1}{8} \approx 3$

Because $3 \times 3 = 9$,

I know $2\frac{5}{6} \times 3\frac{1}{8} \approx 9$.

16. $3\frac{8}{9} \times 2\frac{7}{15}$

17. $9\frac{6}{7} \times 4\frac{1}{5}$

18. $6\frac{4}{7} \times 2\frac{1}{9}$

19. $3\frac{11}{13} \times 4\frac{9}{10}$

20. $7\frac{5}{9} \times 5\frac{13}{15}$

Calculate each product. Write your answer in simplest form.

3

21. $3\frac{4}{5} \times 2\frac{1}{2}$

$$3\frac{4}{5} \times 2\frac{1}{2} = \frac{19}{5} \times \frac{5}{2}$$
$$= \frac{95}{10}$$
$$= 9\frac{5}{10}$$
$$= 9\frac{1}{2}$$

22. $1\frac{3}{8} \times 6\frac{1}{4}$

23. $5\frac{2}{3} \times 4\frac{1}{6}$

24. $2\frac{1}{3} \times 7\frac{1}{4}$

25. $8\frac{1}{3} \times 3$

26. $7\frac{2}{5} \times 2$

27. $6\frac{1}{2} \times 1\frac{3}{4}$

28. $3\frac{1}{8} \times 5\frac{1}{2}$

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Yours Is to Reason Why!
Parts in a Part

Vocabulary

Choose the term from the box that best completes each statement.

reciprocal	multiplicative inverse	Multiplicative Inverse Property

1. The _____ of a number $\frac{a}{b}$ is the number $\frac{b}{a}$, where a and b are nonzero numbers.

2. When you reverse the numbers in the numerator and denominator of a fraction, you form a new fraction called the _____.

3. The reciprocal of a number is also known as the _____ of the number.

4. The _____ states: $\frac{a}{b} \times \frac{b}{a} = 1$, where a and b are nonzero numbers.

Problem Set

Draw a diagram to represent each division problem. Then calculate the quotient.

1. $\frac{1}{2} \div \frac{1}{4}$

$\frac{1}{2} \div \frac{1}{4} = 2$

2. $4 \div \frac{2}{3}$

3. $\frac{3}{4} \div \frac{1}{8}$

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

5. $\frac{5}{2} \div \frac{1}{2}$

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

Write the reciprocal of each fraction. Then show that the product of the original fraction and its reciprocal is 1.

7. $\frac{3}{5}$

The reciprocal of $\frac{3}{5}$ is $\frac{5}{3}$.

$\frac{3}{5} \times \frac{5}{3} = \frac{15}{15}$

$\quad\quad = 1$

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

9. $\frac{1}{7}$

10. 23

11. $\frac{9}{8}$

12. $\frac{3}{7}$

Calculate each quotient. Simplify your answer.

13. $\frac{5}{6} \div \frac{1}{2}$

$\frac{5}{6} \div \frac{1}{2} = \frac{5}{6} \times \frac{2}{1}$

$\quad\quad = \frac{10}{6}$

$\quad\quad = 1\frac{4}{6}$

$\quad\quad = 1\frac{2}{3}$

14. $\frac{8}{9} \div \frac{2}{3}$

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15. $\frac{7}{8} \div \frac{1}{4}$ **16.** $\frac{3}{4} \div \frac{1}{6}$

17. $\frac{15}{16} \div \frac{3}{4}$ **18.** $\frac{7}{12} \div \frac{1}{3}$

Draw a diagram to represent each problem. Then solve the problem.

19. Hector has 6 cups of popcorn. How many friends can he share the popcorn with if each is given $\frac{2}{3}$ cup?

$$\frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3} \quad \frac{2}{3}$$

$$6$$
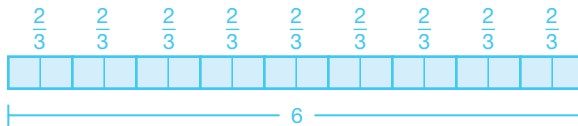
$$\frac{6}{1} \div \frac{2}{3} = \frac{6}{1} \times \frac{3}{2}$$
$$= \frac{18}{2}$$
$$= 9$$

Hector can share the popcorn with 9 friends.

20. Sherwin has 3 cups of grapes. He likes to pack $\frac{3}{4}$ cup of fruit in his lunch each day. How many days can Sherwin pack grapes in his lunch?

3

21. Lea has $\frac{3}{4}$ cup of laundry detergent left in the detergent bottle. Each load of laundry requires $\frac{1}{6}$ cup of detergent. How many loads of laundry can Lea wash?

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22. LaVonne has $\frac{4}{5}$ cup of blueberries. A batch of blueberry muffins requires $\frac{1}{3}$ cup of blueberries. How many batches of blueberry muffins can LaVonne make?

3

23. Nina has $\frac{2}{3}$ cup of shampoo left in the shampoo bottle. She uses $\frac{1}{8}$ cup of shampoo to wash her hair. If Nina washes her hair every day, how many days can she wait before opening a new bottle of shampoo?

24. Carmen has 5 pints of strawberries. She needs $\frac{3}{2}$ pints to make a batch of strawberry ice cream. How many batches of strawberry ice cream can Carmen make?

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Divide Your Time Well, and Your Trail Mix, and Your . . .
Mixed Number Division

Problem Set

Calculate each quotient. Simplify your answer.

1. $9\frac{1}{3} \div 2\frac{1}{3}$

$$9\frac{1}{3} \div 2\frac{1}{3} = \frac{28}{3} \div \frac{7}{3}$$
$$= \frac{28}{3} \cdot \frac{3}{7}$$
$$= \frac{4}{1} \cdot \frac{1}{1} = \frac{4}{1} = 4$$

2. $10\frac{1}{5} \div 3\frac{2}{5}$

3. $19 \div 6\frac{1}{4}$
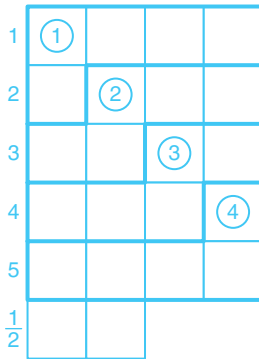
4. $12\frac{1}{2} \div 2\frac{1}{3}$

5. $7\frac{3}{4} \div 1\frac{1}{4}$

6. $15\frac{2}{3} \div 4\frac{5}{6}$

Use a model to calculate each quotient.

7. $5\frac{1}{2} \div 1\frac{1}{4}$

Draw a model for $5\frac{1}{2}$. Divide the model into $\frac{1}{4}$'s. Mark off groups of $\frac{5}{4}$. There are 4 whole groups. The remaining two parts are $\frac{2}{5}$ of a group. Therefore, $5\frac{1}{2} \div 1\frac{1}{4} = 4\frac{2}{5}$.

8. $6\frac{1}{2} \div 2\frac{1}{2}$

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9. $7\dfrac{1}{3} \div 1\dfrac{2}{3}$

10. $5\dfrac{3}{4} \div 1\dfrac{1}{8}$

11. $6 \div 2\dfrac{1}{3}$

3

12. $7\dfrac{3}{4} \div 3\dfrac{1}{4}$

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Solve each problem.

13. Each box of Zippy-Snap Cereal contains 16 ounces of cereal. How many $1\frac{1}{4}$ ounce servings does each box contain?

$16 \div 1\frac{1}{4} = \frac{16}{1} \div \frac{5}{4} = \frac{16}{1} \cdot \frac{4}{5} = \frac{64}{5} = 12\frac{4}{5}$

Each box of cereal contains $12\frac{4}{5}$ servings.

14. Three friends brew $25\frac{1}{4}$ ounces of coffee. If they divide the coffee equally, how much coffee will each friend get?

15. Two employees at a warehouse are stacking crates in a room that is $9\frac{3}{4}$ feet tall. If each crate is $1\frac{5}{8}$ feet tall, what is the maximum number of crates in each stack?

16. How many acres can be fertilized by a 100-pound bag of fertilizer if it takes $13\frac{1}{3}$ pounds to fertilize one acre?

17. Ms. Duncan is placing geometry books side by side on a bookshelf. How many books can she place on the shelf if each book is $1\frac{7}{8}$ inches wide and the shelf is $26\frac{3}{4}$ inches wide?

18. Rosita is making pizzas for a party. Each pizza requires $1\frac{1}{4}$ cups of sauce and $1\frac{3}{4}$ cups of cheese. How many whole pizzas can Rosita make if she only has $8\frac{1}{2}$ cups of sauce and $13\frac{1}{2}$ cups of cheese?

3