

Fractions and Division

Write a division expression for each fraction.

1. $\frac{4}{10}$ $4 \div 10$ 2. $\frac{1}{6}$ $1 \div 6$ 3. $\frac{2}{7}$ $2 \div 7$
 4. $\frac{3}{8}$ $3 \div 8$ 5. $\frac{5}{12}$ $5 \div 12$ 6. $\frac{3}{17}$ $3 \div 17$
 7. $\frac{7}{9}$ $7 \div 9$ 8. $\frac{18}{25}$ $18 \div 25$ 9. $\frac{99}{100}$ $99 \div 100$

Write each division expression as a fraction.

10. $7 \div 12$ $\frac{7}{12}$ 11. $2 \div 5$ $\frac{2}{5}$ 12. $8 \div 11$ $\frac{8}{11}$
 13. $1 \div 8$ $\frac{1}{8}$ 14. $7 \div 10$ $\frac{7}{10}$ 15. $6 \div 13$ $\frac{6}{13}$
 16. $5 \div 9$ $\frac{5}{9}$ 17. $11 \div 21$ $\frac{11}{21}$ 18. $13 \div 100$ $\frac{13}{100}$

19. Zane was telling his mother that he learned about rational numbers in school. Which is the definition of a rational number?

- A Any number that can be shown as the quotient of two integers
 B Any number that can be shown as the product of two integers
 C Any number that can be written as an integer
 D Any integer that can be written as a decimal

20. Tanisha used the division expression $2 \div 5$ to equally divide two same-size pizzas among five people. Which fraction represents each person's share of the pizza?

- A $\frac{5}{2}$
 B $\frac{2}{5}$
 C $\frac{2}{7}$
 D $\frac{5}{7}$

21. **Writing to Explain** Can the division expression $-4 \div 15$ be shown as a fraction? If yes, write the fraction. Explain why or why not.

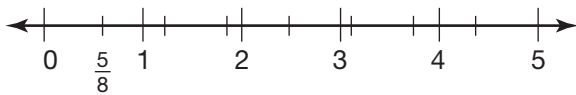
Yes, both numbers are integers, so they can be written as the fraction $\frac{-4}{15}$.

Fractions and Division

You can think of fractions as division: The numerator is the same as the dividend and the denominator is the same as the divisor.

Write $\frac{5}{8}$ as a division expression.

Think: $\frac{1}{8}$ of 5 wholes.

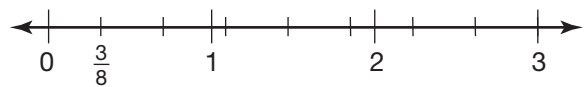


Shortcut: The numerator is 5, so the dividend is 5. The denominator is 8, so the divisor is 8.

So $\frac{5}{8} = 5 \div 8$.

Write $3 \div 8$ as a fraction.

Think: 3 wholes divided into 8 equal parts. Each part is equal to $\frac{3}{8}$.



Shortcut: The dividend is 3, so the numerator is 3. The divisor is 8, so the denominator is 8.

So $3 \div 8 = \frac{3}{8}$.

Write a division expression for each fraction.

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

2. $\frac{2}{5}$ $2 \div 5$ 3. $\frac{7}{8}$ $7 \div 8$ 4. $\frac{3}{10}$ $3 \div 10$

5. $\frac{5}{7}$ $5 \div 7$ 6. $\frac{4}{15}$ $4 \div 15$ 7. $\frac{10}{13}$ $10 \div 13$

Write each division expression as a fraction.

8. $4 \div 5$ $\frac{4}{5}$ 9. $2 \div 3$ $\frac{2}{3}$ 10. $2 \div 9$ $\frac{2}{9}$

11. $1 \div 6$ $\frac{1}{6}$ 12. $9 \div 10$ $\frac{9}{10}$ 13. $11 \div 12$ $\frac{11}{12}$

14. **Writing to Explain** Explain how to write *seventeen divided by twenty* as a division expression and as a fraction.

Sample answer: Write symbols for the words:

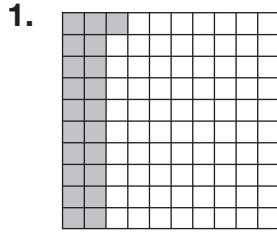
$17 \div 20$. Use the dividend as the numerator

and the divisor as the denominator to write a

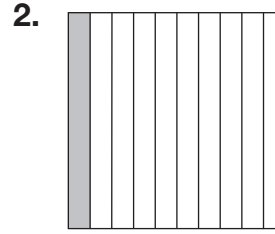
fraction: $\frac{17}{20}$.

Fractions and Decimals

Write a decimal and a fraction in simplest form for each shaded portion.



0.21, $\frac{21}{100}$



0.1, $\frac{1}{10}$

Write each decimal as a fraction in simplest form.

3. 0.15 $\frac{3}{20}$

4. 0.31 $\frac{31}{100}$

5. 0.82 $\frac{41}{50}$

6. 0.27 $\frac{27}{100}$

7. 0.375 $\frac{3}{8}$

8. 0.920 $\frac{23}{25}$

Convert each fraction to a decimal.

9. $\frac{56}{100}$ 0.56

10. $\frac{90}{200}$ 0.45

11. $\frac{9}{25}$ 0.36

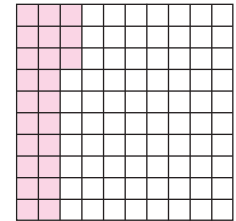
12. $\frac{8}{50}$ 0.16

13. $\frac{57}{60}$ 0.95

14. $\frac{7}{8}$ 0.875

15. **Draw a Picture** Show $\frac{46}{200}$ on the hundredths grid. Then write the fraction as a decimal.

0.23



16. About $\frac{2}{5}$ of the students in the after school program have a cell phone. Which decimal is equivalent to $\frac{2}{5}$?

A 0.2

B 0.25

C 0.4

D 0.5

17. **Writing to Explain** Solve the problem. Then explain how you found the answer. In Tori's favorite class, $\frac{12}{25}$ of the students are girls. Write a decimal that represents the number of boys in the class.

0.52; Sample answer: I wrote $\frac{12}{25}$ as a decimal, 0.48, and then I subtracted the decimal from 1: $1 - 0.48 = 0.52$.

Fractions and Decimals

A fraction and a decimal can both be used to represent the same value.

Write 0.35 as a fraction.

Write the decimal as a fraction with a denominator of 10, 100, 1000, or another power of ten.

$$0.35 = 35 \text{ hundredths} = \frac{35}{100}$$

Then write the fraction in simplest form.

$$\frac{35}{100} = \frac{35 \div 5}{100 \div 5} = \frac{7}{20}$$

$$\text{So } 0.35 = \frac{7}{20}.$$

Write $\frac{3}{25}$ as a decimal.

Method 1: Write an equivalent fraction with a denominator of 10, 100, 1000, or another power of ten. Then write the decimal.

$$\frac{3}{25} = \frac{3 \times 4}{25 \times 4} = \frac{12}{100} = 0.12$$

Method 2: Divide the numerator by the denominator.

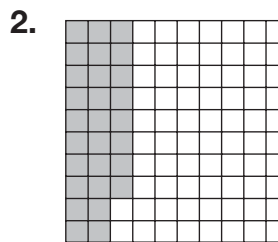
$$\text{So } \frac{3}{25} = 0.12.$$

$$\begin{array}{r} 0.12 \\ 25 \overline{)3.00} \\ \underline{-25} \\ 50 \\ \underline{-50} \\ 0 \end{array}$$

Write a decimal and a fraction in simplest form for each shaded portion.



$$0.6, \frac{3}{5}$$



$$0.28, \frac{7}{25}$$

Write each decimal as a fraction in simplest form.

3. 0.5 = $\frac{1}{2}$

4. 0.8 = $\frac{4}{5}$

5. 0.36 = $\frac{9}{25}$

6. 0.25 = $\frac{1}{4}$

7. 0.125 = $\frac{1}{8}$

8. 0.070 = $\frac{7}{100}$

Convert each fraction to a decimal.

9. $\frac{93}{100}$ = 0.93

10. $\frac{7}{10}$ = 0.7

11. $\frac{11}{20}$ = 0.55

12. $\frac{14}{25}$ = 0.56

13. $\frac{7}{40}$ = 0.175

14. $\frac{6}{100}$ = 0.06

15. **Geometry** Draw eight congruent figures. Shade some of the figures to make a color pattern. Write a decimal and a fraction in simplest form to represent the shaded part of the set.

Sample answer: Four squares shaded, four squares not shaded, 0.5, $\frac{1}{2}$

Improper Fractions and Mixed Numbers

1. Draw a picture to show $\frac{9}{7}$.

2. Draw a picture to show $3\frac{4}{5}$.

Check students' drawings.

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

3. $\frac{25}{5}$ 5

4. $\frac{47}{9}$ $5\frac{2}{9}$

5. $\frac{52}{7}$ $7\frac{3}{7}$

Write each mixed number as an improper fraction.

6. $4\frac{4}{5}$ $\frac{24}{5}$

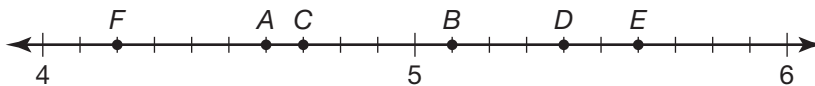
7. $13\frac{3}{4}$ $\frac{55}{4}$

8. $9\frac{5}{8}$ $\frac{77}{8}$

9. **Reasoning** Write 8 as an improper fraction with a denominator of 4.

$\frac{32}{4}$

Which letter on the number line corresponds to each number?



10. $5\frac{2}{5}$ D

11. $4\frac{7}{10}$ C

12. $\frac{23}{5}$ A

13. Which number does the picture show?



A $\frac{12}{8}$

B $2\frac{1}{8}$

C $2\frac{1}{4}$

D $\frac{20}{8}$

14. **Writing to Explain** Can you express $\frac{9}{9}$ as a mixed number? Why or why not?

No, $\frac{9}{9}$ can be expressed only as a fraction or as a whole number (1).

Improper Fractions and Mixed Numbers

A mixed number combines a whole number with a fraction. It is greater than one.

An improper fraction has a numerator that is larger than its denominator.

How to Write an Improper Fraction as a Mixed Number

Write $\frac{12}{5}$ as a mixed number.

Divide the numerator by the denominator.

The quotient is the whole number in the mixed number.

$$\begin{array}{r} 2 \\ 5 \overline{)12} \\ \underline{-10} \\ 2 \end{array}$$

The remainder is the numerator.
The denominator stays the same.

$$\frac{12}{5} = 2\frac{2}{5}$$

How to Write a Mixed Number as an Improper Fraction

Multiply the denominator by the whole number.

$$3\frac{2}{5}$$

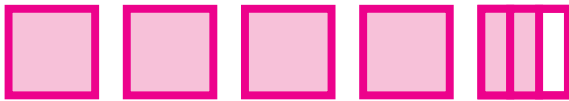
$$5 \times 3 = 15$$

Then add the numerator. $15 + 2 = 17$

Write this number for the numerator. $\rightarrow \frac{17}{5}$
Use the original denominator. $\rightarrow \frac{17}{5}$

$$3\frac{2}{5} = \frac{17}{5}$$

1. Draw a picture to show $4\frac{2}{3}$.



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

2. $\frac{60}{40}$ $\underline{\hspace{2cm}}$ $1\frac{1}{2}$

3. $\frac{33}{10}$ $\underline{\hspace{2cm}}$ $3\frac{3}{10}$

4. $\frac{12}{7}$ $\underline{\hspace{2cm}}$ $1\frac{5}{7}$

Write each mixed number as an improper fraction.

5. $4\frac{1}{3}$ $\underline{\hspace{2cm}}$ $\frac{13}{3}$

6. $1\frac{20}{50}$ $\underline{\hspace{2cm}}$ $\frac{70}{50}$

7. $8\frac{7}{8}$ $\underline{\hspace{2cm}}$ $\frac{71}{8}$

8. **Reasoning** Write 6 as an improper fraction with a denominator of 10.

$\underline{\hspace{2cm}}$ $\frac{60}{10}$

Decimal Forms of Fractions and Mixed Numbers

Write each fraction or mixed number as a decimal.

1. $\frac{33}{100}$.33 2. $\frac{2}{5}$ 0.4 3. $\frac{1}{6}$ 0.1 $\bar{6}$
 4. $1\frac{3}{16}$ 1.1875 5. $4\frac{7}{9}$ 4.7 $\bar{7}$ 6. $6\frac{5}{11}$ 6.4 $\bar{5}$

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

7. 0.08 $\frac{2}{25}$ 8. 0.24 $\frac{6}{25}$ 9. 0.325 $\frac{13}{40}$
 10. 4.75 $4\frac{3}{4}$ 11. 1.06 $1\frac{3}{50}$ 12. 5.15 $5\frac{3}{20}$

13. The label on a cosmetic bottle says 0.04 oz. What is the fraction equivalent for this amount? $\frac{1}{25}$ oz.
 14. The scale at a deli counter shows 2.54 lb. What is the mixed number equivalent for the number shown? $2\frac{27}{50}$ lb.
 15. **Reasoning** What is a situation in which you would use fractions to express a number less than one? What is a situation in which decimals seem to work better?

Sample answers: Only $\frac{1}{3}$ of the cars are red;

Sara's batting average is .324.

16. Which decimal is equivalent to $4\frac{4}{5}$?

- A 4.4
 B 4.45
 C 4.5
D 4.8

17. **Writing to Explain** How do you know where to place the bar when a decimal is a repeating decimal?

Sample answer: Place the bar over the number or numbers that repeat.

Decimal Forms of Fractions And Mixed Numbers

How to Convert Fractions to Decimals

Write $\frac{5}{9}$ as a decimal.

Divide the numerator by the denominator.
Annex zeros if necessary.

$$\begin{array}{r} 0.555 \\ 9 \overline{)5.000} \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 50 \\ \underline{-45} \\ 5 \end{array}$$

The decimal 0.555 is a repeating decimal.
Place a bar over the repeating digit.

So, $\frac{5}{9} = 0.\overline{5}$.

How to Convert Decimals to Fractions

Write 0.65 as a fraction.

$$0.65 = 65 \text{ hundredths} = \frac{65}{100}$$

Write $\frac{65}{100}$ in simplest form.

$$\frac{65}{100} = \frac{65 \div 5}{100 \div 5} = \frac{13}{20}$$

$$\text{So, } 0.65 = \frac{13}{20}$$

Write 3.375 as a mixed number.

$$3.375 = 3 + 0.375$$

$$0.375 = 375 \text{ thousandths} = \frac{375}{1,000}$$

$$\frac{375}{1,000} = \frac{375 \div 125}{1,000 \div 125} = \frac{3}{8}$$

$$3 + \frac{3}{8} = 3\frac{3}{8}$$

$$\text{So, } 3.375 = 3\frac{3}{8}$$

Write each fraction or mixed number as a decimal.

1. $\frac{1}{3}$ 0. $\overline{3}$

2. $\frac{20}{100}$ 0.2

3. $\frac{6}{10}$ 0.6

4. $2\frac{1}{4}$ 2.25

5. $5\frac{1}{8}$ 5.125

6. $1\frac{4}{9}$ 1. $\overline{4}$

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

7. 0.4 $\frac{2}{5}$

8. 0.625 $\frac{5}{8}$

9. 0.45 $\frac{9}{20}$

10. 3.2 $3\frac{1}{5}$

11. 2.18 $2\frac{9}{50}$

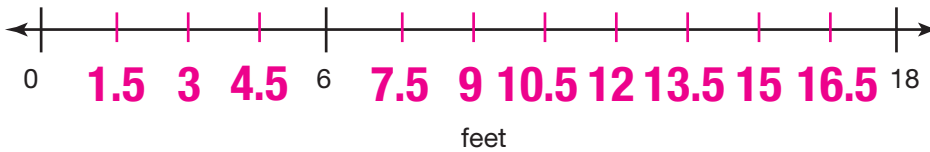
12. 4.68 $4\frac{17}{25}$

13. **Number Sense** The Lady Bug trail in Sequoia National Forest is 5.1 miles long. How does it compare to a trail that is $5\frac{2}{5}$ miles long?

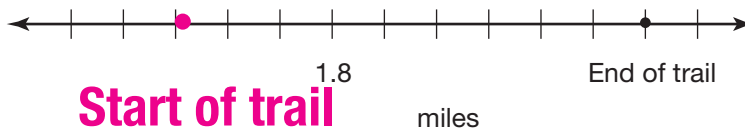
Sample answer: $5\frac{2}{5}$ converts to 5.4, so the Lady Bug trail is the shorter of the two trails.

Problem Solving: Draw a Picture

1. A community swimming pool places buoys every 1.5 feet across the pool to mark off swimming areas. Use your ruler and the number line to show where each buoy is placed.



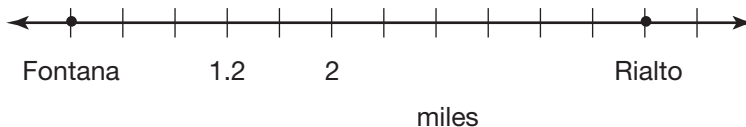
2. A trail is marked every 0.6 mile. Use the number line below to show the start of the trail if the trail is 5.4 miles long.



3. A conveyer belt at a factory moves parts from station to station. The stations are 0.75 feet apart. Draw and label a number line that shows stops at 0.75, 2.25, and 4.5 feet.



4. Kayla drew the number line to show the distance between Fontana and Rialto. If Fontana is 0, what is the label at Rialto?



- A 4.2
 B 4.4
 C 4.8
 D 5.2
5. **Writing to Explain** Maggie is planting bushes every 1.5 feet along the side of a fence. The fence is 22.5 feet long. Explain how Maggie can draw a picture to show where each bush is planted.

Sample answer: She can draw a number line starting at 0 and ending at 22.5 with each unit on the number line representing 1.5 feet, for a total of 15 units.

Problem Solving: Draw a Picture

Sometimes you need to draw a picture to solve a problem.

Jasmine is making a charm bracelet. She wants to put a charm every 0.5 inch on the bracelet. The bracelet is 6 inches long. Use a ruler and the number line below to mark and label the place for each charm.



Read and Understand

You know the length of the bracelet and where to place each charm. You know the length of the number line.

You need to mark and label each 0.5 unit on the number line.

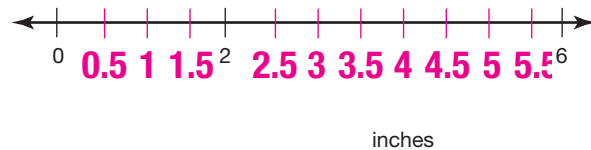
Plan and Solve

Divide the line from 0 to 2 into fourths to show 0.5, 1, and 1.5.

Use each unit of 0.5 to mark and label the rest of the number line.

bracelet = 6 inches
charm = every 0.5 inches
number line = labels at 0, 2, and 6

Measure the number line to divide it into equal units of 0.5.



Draw a picture to solve the problems.

1. A neighborhood has speed bumps every 0.25 miles along the main road. Use your ruler and the number line to mark and label the place of each speed bump.



2. A path between neighborhoods is 0.7 miles long. Mark and label the end of the path on the number line below.

