

Vocabulary Start-Up



$$\frac{3}{4} \rightarrow 3 \div 4 = 0.75$$

Any fraction can be expressed as a decimal by dividing the numerator by the denominator.

The decimal form of a fraction is called a **repeating decimal**. Repeating decimals can be represented using **bar notation**. In bar notation, a bar is drawn only over the digit(s) that repeat.

$$0.3333... = 0.\overline{3} \quad 0.1212... = 0.\overline{12} \quad 11.38585... = 11.\overline{385}$$

If the repeating digit is zero, the decimal is a **terminating decimal**.

The terminating decimal $0.25\overline{0}$ is typically written as 0.25.

Match each repeating decimal to the correct bar notation.

0.1111... ~~_____~~ $0.\overline{61}$

0.61111... ~~_____~~ $0.\overline{1}$

0.616161... _____ $0.\overline{61}$

Write Fractions as Decimals

Our decimal system is based on powers of 10 such as 10, 100, and 1,000. If the denominator of a fraction is a power of 10, you can use place value to write the fraction as a decimal.

Complete the table below. Write fractions in simplest form.

Words	Fraction	Decimal
seven tenths	$\frac{7}{10}$	0.7
nineteen hundredths	$\frac{19}{100}$	0.19
one-hundred five thousandths	$\frac{105}{1000}$	0.105

If the denominator of a fraction is a *factor* of 10, 100, 1,000, or any greater

Examples

Write each fraction or mixed number as a decimal.

1. $\frac{74}{100}$

Use place value to write the equivalent decimal.

$$\frac{74}{100} = 0.74 \quad \text{Read } \frac{74}{100} \text{ as } \textit{seventy-four hundredths}.$$

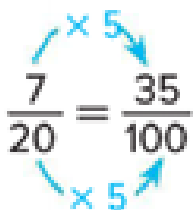
$$\text{So, } \frac{74}{100} = 0.74.$$

Handwritten notes in blue ink:

- 0.
- 0.105
- 0.19
- 0.74

2. $\frac{7}{20}$

Think $\frac{7}{20} = \frac{35}{100}$



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

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

$$\begin{aligned} 5\frac{3}{4} &= 5 + \frac{3}{4} \\ &= 5 + 0.75 \\ &= 5.75 \end{aligned}$$

So, $5\frac{3}{4} = 5.75$.

Think of it as a sum.

You know that $\frac{3}{4} = 0.75$.

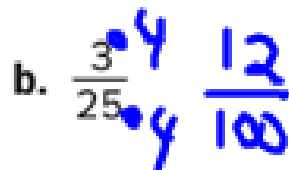
Add mentally.

Got it? Do these problems to find out.

a. $\frac{3}{10}$

0.3

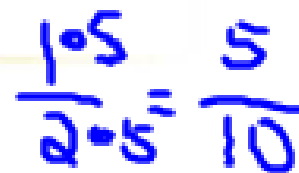
b. $\frac{3}{25}$



0.12

c. $-6\frac{1}{2}$

-6.5



Examples

4. Write $\frac{3}{8}$ as a decimal.

$$\begin{array}{r} 0.375 \\ 8 \overline{)3.000} \\ \underline{-24} \\ 60 \\ \underline{-56} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Divide 3 by 8.

Division ends when the remainder is 0.

So, $\frac{3}{8} = 0.375$.

Handwritten long division for $\frac{3}{8}$. The quotient is written as 0.375. The steps show 8 dividing 3.000 to get 0.375 with a remainder of 0. A blue asterisk is drawn at the bottom right.

5. Write $-\frac{1}{40}$ as a decimal.

$$\begin{array}{r} 0.025 \\ 40 \overline{)1.000} \\ \underline{-80} \\ 200 \\ \underline{-200} \\ 0 \end{array}$$

Divide 1 by 40.

So, $-\frac{1}{40} = -0.025$.

6. Write $\frac{7}{9}$ as a decimal.

$$\begin{array}{r} 0.777... \\ 9 \overline{)7.000} \\ \underline{-63} \\ 70 \\ \underline{-63} \\ 70 \\ \underline{-63} \\ 7 \end{array}$$

Divide 7 by 9.

Notice that the division will never terminate in zero.

So, $\frac{7}{9} = 0.777... \text{ or } 0.\overline{7}$.

Got it? Do these problems to find out.

$$8 \overline{) 1.000} \begin{array}{r} 0.125 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Write each fraction or mixed number as a decimal. Use bar notation if needed.

d. $-\frac{7}{8} = -0.875$

e. $2\frac{1}{8} = 2.125$

f. $-\frac{3}{11} = -0.\overline{27}$

g. $8\frac{1}{3} = 8.\overline{3}$

d)
$$8 \overline{) 1.000} \begin{array}{r} 0.875 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

0 terminating

f)
$$11 \overline{) 3.0000} \begin{array}{r} 0.2727 \\ \underline{22} \\ 80 \\ \underline{77} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ 30 \\ \underline{27} \\ \dots \end{array}$$

Repeating