

decimal
point
and

4 6, 5 0 2 . 7 3 8

ten-thousands thousands hundreds tens ones tenths hundredths thousandths

forty-six thousand, five hundred two,
and seven hundred thirty-eight thousandths

0. 0 7 3 8
10,000

seven hundred thirty-eight ten-thousandths

.62
100

sixty-two hundredths

.014
1000

fourteen thousandths

2.1 $-6.\overline{0002}$
10,000

two and one tenth

negative six and two ten-thousandths

In the previous six examples, we went from decimals to words. Now we will go from words to decimals, and to fractions as well.

two hundred six ten-thousandths

fraction

$$\frac{206}{10,000}$$
decimal $.0206$

three hundred five and seven hundredths

fraction

$$305\frac{7}{100}$$
decimal 305.07

Now we will focus on converting from fractions to decimals; this helps to reveal what decimals are, which is, fractions with “power of ten” denominators.

tenths	hundredths	thousandths	ten-thousandths
$\frac{1}{10} = .1$ 10^1	$\frac{1}{100} = .01$ 10^2	$\frac{1}{1000} = .001$ 10^3	$\frac{1}{10,000} = .0001$ 10^4
$\frac{4}{10} = .4$	$\frac{8}{100} = .08$	$\frac{5}{1000} = .005$	$\frac{7}{10,000} = .0007$
	$\frac{57}{100} = .57$	$\frac{83}{1000} = .083$	$\frac{19}{10,000} = .0019$
		$\frac{732}{1000} = .732$	$\frac{243}{10,000} = .0243$
			$\frac{6,402}{10,000} = .6402$

Fractions without “powers of ten” denominators can be written as decimals by doing what the fraction says- divide.

So $\frac{5}{8}$ is really a shorthand way of writing $5 \div 8$, which we calculate as:

$$\begin{array}{r} \textcircled{.625} \\ 8 \overline{) 5.000} \\ \underline{-48} \\ 20 \\ \underline{-16} \\ 40 \\ \underline{-40} \\ 0 \end{array}$$

Thus, converting $\frac{5}{8}$ to a decimal yields 0.625.

So $\frac{3}{4}$ is really a shorthand way of writing $3 \div 4$, which we calculate as:

$$\begin{array}{r} \textcircled{.75} \\ 4 \overline{) 3.00} \\ \underline{-28} \\ 20 \\ \underline{-20} \\ 0 \end{array}$$

Thus, converting $\frac{3}{4}$ to a decimal yields 0.75.

To convert decimal to fraction, rewrite it (*without the decimal point*) over the appropriate power of ten, reduce if possible.

$$\begin{array}{l} .75 \\ 100 \end{array} = \frac{75}{100} = \left(\frac{3}{4} \right)$$

$$\begin{array}{l} .625 \\ 1000 \end{array} = \frac{625}{1000} = \frac{25}{40} = \left(\frac{5}{8} \right)$$

$$\begin{array}{r} 25 \\ 25 \overline{)625} \\ \underline{-50} \\ 125 \end{array}$$

$$\begin{array}{l} .0013 \\ 10,000 \end{array} = \left(\frac{13}{10,000} \right)$$

Conversions with Mixed Numbers:

Fraction to Decimal: $3\frac{7}{100}$

$$3.07$$

Fraction to Decimal: $-9\frac{1 \cdot 25}{4 \cdot 25} = \frac{25}{100}$

$$-9.25$$

$$4 \overline{) 11.00} \\ \underline{-8} \\ 20$$

Decimal to Fraction: -56.003

$$-56\frac{3}{1000}$$

Decimal to Fraction: 27.8

$$27\frac{8}{10}$$

$$27\frac{4}{5}$$