

# **Division of Decimals; Percents, Fractions, and Decimals**

We've already studied division of whole numbers. Now, let's look at dividing decimals. We will estimate our answers first to be sure that our actual answers are reasonable.

Percents are used to express decimals and fractions in another way. First, we'll look at some percent models to find out just what a percent means. Then, we will look at how fractions, decimals, and percents all go together.

Dividing Decimals by One-Digit Whole Number

Dividing Money and Rounding Quotient

Dividing Decimals by Two-Digit Whole Number

Percents

Percents, Fractions, and Decimals

## Dividing Decimals by One-Digit Whole Number

To divide a decimal by a whole number, **place the decimal point in the *quotient* right above the decimal in the *dividend*.**

Divide 18.8 by 4

*Estimate*

$$20 \div 4 = 5$$

$$\begin{array}{r} \text{Divisor} \swarrow \quad \quad \quad \nwarrow \text{Quotient} \\ 4 \overline{)18.8} \\ \underline{16} \phantom{0} \\ 28 \\ \underline{28} \\ 0 \end{array} \quad \begin{array}{l} \swarrow \text{Dividend} \\ \downarrow \end{array}$$

*Check: The estimate, 5, is close to 4.7.*

Divide 0.72 by 8

*Estimate*

$$0.8 \div 8 = 0.1$$

*Place the decimal point first*

$$\begin{array}{r} 0.09 \\ 8 \overline{)0.72} \\ \underline{72} \\ 0 \end{array}$$

Since 8 is divided into hundredths instead of tens, a 0 is needed to fill in the empty place between the decimal point and the 9.

*Check: The estimate, 0.1, is close to 0.09.*

# Dividing Money and Rounding Quotient

When dividing money, divide through enough places so that the quotient can be rounded to the nearest cent.

Divide \$15.89 by 6. Round to nearest cent.

*Estimate*  
 $18 \div 6 = 3$

$$\begin{array}{r} 2.648 \\ 6 \overline{)15.890} \\ \underline{12} \phantom{0} \\ 38 \phantom{0} \\ \underline{36} \phantom{0} \\ 29 \phantom{0} \\ \underline{24} \phantom{0} \\ 50 \phantom{0} \\ \underline{48} \phantom{0} \\ 2 \phantom{0} \end{array}$$

Round to nearest cent. Since the 8 is 5 or higher, round the 4 up. The rounded answer is **\$2.65**.

Add a zero and continue to divide. Adding zeros after a decimal number does not change the value of the number.

Just stop dividing. Since there are three decimal places in the quotient, this gives an extra place to round to nearest cent.

*Check: The estimate, 3, is close to 2.648.*

## Dividing Decimals by Two-Digit Whole Number

To divide a decimal by a whole number, **place the decimal point** in the *quotient* right **above the decimal** in the *dividend*.

Divide 131.04 by 63.

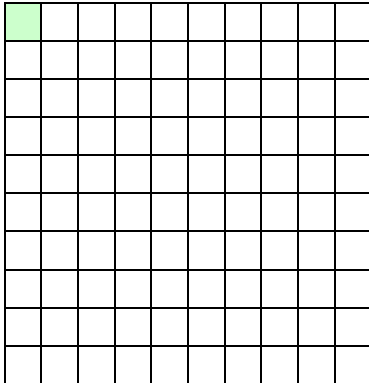
*Estimate*  
 $120 \div 60 = 2$

$$\begin{array}{r} 2.08 \\ 64 \overline{)133.14} \\ \underline{128} \phantom{00} \\ 514 \\ \underline{514} \\ 00 \end{array}$$

After bringing down the 1, 51 is not large enough to be divided by 64, so put a 0 as a place holder in the quotient above the 1, then bring down a second number, 4, and continue to divide.

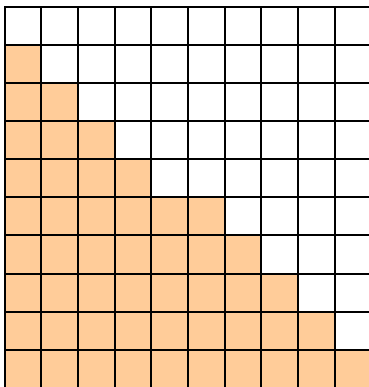
*Check:* The estimate, 2, is close to 2.08.

# Percents

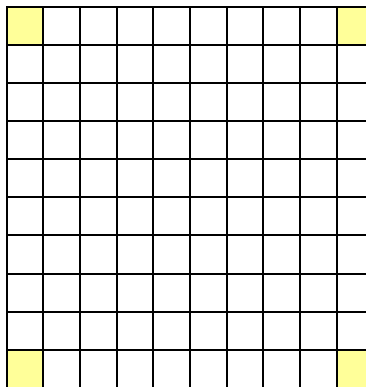


This grid measures 10 units by 10 units, thus the whole grid has 100 squares in it. Count them. Each square represents 1 percent (%) of the whole square block. 1% is shaded green.

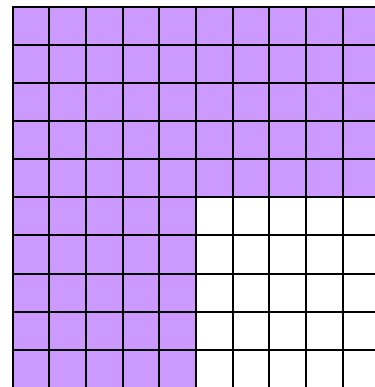
1% means 1 out of 100 or  $\frac{1}{100}$  or .01



50 out of 100 are shaded orange or we could say 50% are shaded orange.



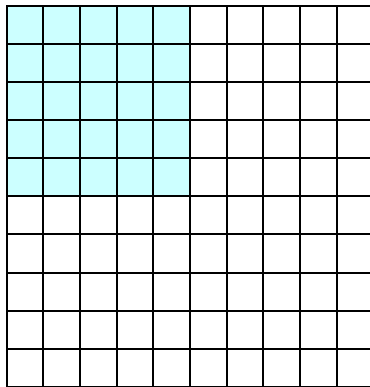
4 out of 100 are shaded yellow or we could say 4% are shaded yellow.



75 out of 100 are shaded lavender or we could say 75% are shaded lavender.

# Percents, Fractions and Decimals

The grid below shows 100 small squares. Twenty-five of the squares are shaded; thus, 25% are shaded. Notice that the decimal for 25% is 0.25 and the simplified fraction for 25% is 1/4.



$$25\% = \frac{25}{100}$$

$\frac{25}{100}$  is 25 hundredths or 0.25

$$\frac{25}{100} \div \frac{25}{25} = \frac{1}{4}$$

Percent → Decimal → Fraction

|                 |   |
|-----------------|---|
|                 | 35%   |
| <b>Decimal</b>  | 0.35  |
| <b>Fraction</b> | $\frac{35}{100}$ simplifies to $\frac{7}{20}$ |

Fraction → Percent → Decimal

|                |   |
|----------------|---|
|                | $\frac{2}{5}$                                       |
| <b>Percent</b> | $\frac{2}{5} \times \frac{20}{20} = \frac{40}{100}$ |
| <b>Decimal</b> | $\frac{40}{100} = 0.40 = 0.4$                       |

Decimal → Fraction → Percent

|                 |                 |
|-----------------|-----------------|
|                 | 0.03            |
| <b>Fraction</b> | $\frac{3}{100}$ |
| <b>Percent</b>  | 3%              |