PERCENTS, FRACTIONS, AND DECIMALS

Percents are all around us. Look at the ads in a newspaper and you will find percents advertised by places offering sales on their merchandise. Percents are a special way to express quantities based on hundredths.

Fractions may be expressed as percents by finding an equivalent fraction in hundredths and then writing the numerator as a percent.

Improper fractions may also be expressed as percents. Improper fractions convert to percents greater than 100.

To find small percents such as percents less than one, write the percent as hundredths and then divide to find the fraction or decimal that could be used in computations.

For every percent there is an equivalent fraction or decimal. Equivalent percents, fractions, and decimals provide a variety of ways to solve problems.
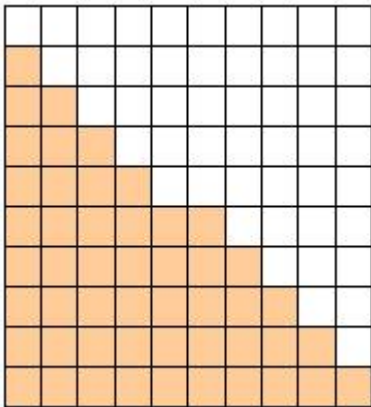
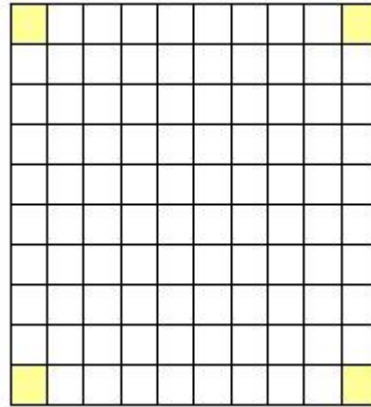To begin, study the decimal squares and solve the problems given.

Percents
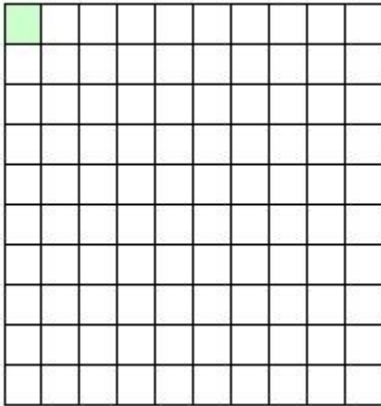
This grid measures 10 units by 10 units, thus the whole grid has 100 squares in it. Count them. Each square represents 1 percent (%) of the whole square block. 1% is shaded green.
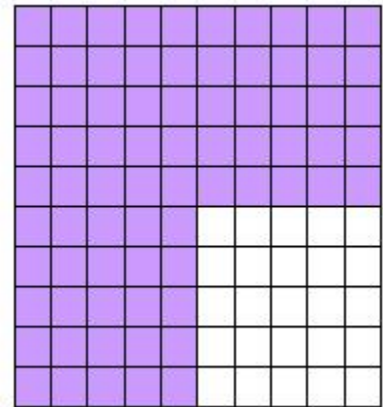
1% means 1 out of 100 or $\frac{1}{100}$ or 0.01.

50 out of 100 are shaded orange so we could say $\frac{50}{100}$ or 50% are shaded orange.

4 out of 100 are shaded yellow so we could say $\frac{4}{100}$ or 4% are shaded yellow.
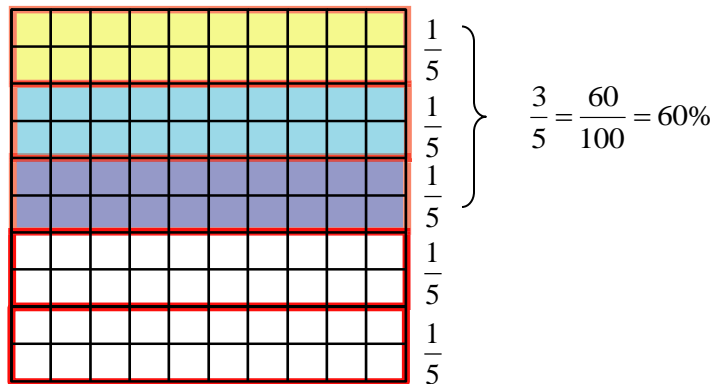
75 out of 100 are shaded lavender so we could say $\frac{75}{100}$ or 75% are shaded lavender.

Fractions to Percent

To write $\dfrac{3}{5}$ as a percent, the fraction must be expressed in hundredths.

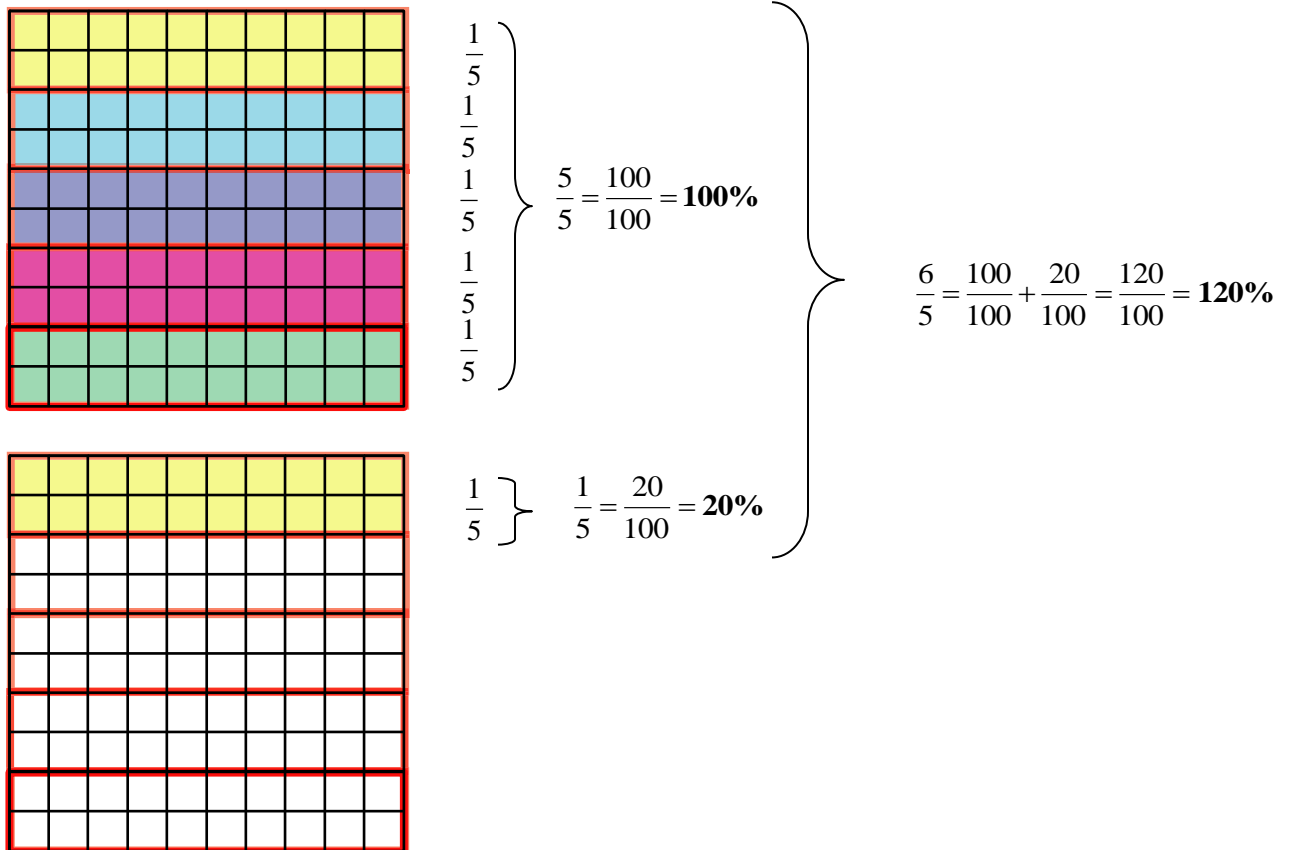Using a decimal square (10 by 10 square), divide the square equally into 5 parts.

$$\frac{3}{5} = \frac{60}{100} = 60\%$$

Improper Fractions to Percents Over 100

Write $\dfrac{6}{5}$ as a percent.

Using decimal squares, you could divide the squares equally into 5 parts.

$$\left.\begin{array}{c}\dfrac{1}{5}\\[4pt]\dfrac{1}{5}\\[4pt]\dfrac{1}{5}\\[4pt]\dfrac{1}{5}\\[4pt]\dfrac{1}{5}\end{array}\right\}\quad \dfrac{5}{5}=\dfrac{100}{100}=\textbf{100\%}$$

$$\left.\dfrac{1}{5}\right\}\quad \dfrac{1}{5}=\dfrac{20}{100}=\textbf{20\%}$$

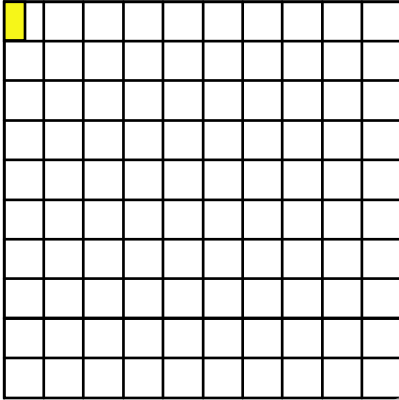$$\dfrac{6}{5}=\dfrac{100}{100}+\dfrac{20}{100}=\dfrac{120}{100}=\textbf{120\%}$$

Percents Less Than One

Write $\frac{1}{2}\%$ as a fraction, then as a decimal.

Use a decimal square and shade in $\frac{1}{2}$ of 1%.

$\frac{1}{2}$ of $\frac{1}{100}$ equals $\frac{1}{2} \times \frac{1}{100} = \frac{1}{200}$

$\frac{1}{2}\% = \frac{1}{200}$ or 0.005

$$200\overline{)1.000} \quad \begin{array}{r} .005 \\ \underline{1\ 000} \end{array}$$

To convert a fraction to a decimal, divide the numerator (top number of a fraction) by the denominator (bottom number of a fraction).

1 is a whole number; therefore, **1,** written as a decimal, is **1.000**. Once you place the decimal point after the **1**, you may add zeros as needed. In this case, three zeros are needed for the division to come out even.

Another Way.

Write $\frac{1}{2}\%$ as a complex fraction.

$$\frac{\frac{1}{2}}{100}$$

Remember that the fraction bar can represent division.

$$\frac{\frac{1}{2}}{100} = \frac{1}{2} \div 100$$

Compute.

$$\frac{1}{2} \div \frac{100}{1} = \frac{1}{2} \times \frac{1}{100} = \frac{1}{200} = 0.005$$

When dividing by a fraction, rewrite as multiplication, and multiply by the inverse. In this case, $\frac{100}{1}$ is written as its inverse, $\frac{1}{100}$.

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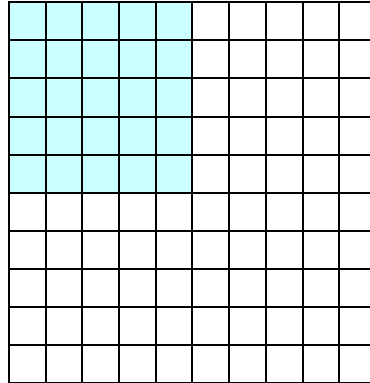
$$\frac{25}{100} = 25\%$$

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

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

$$\frac{25}{100} = 25\% = 0.25 = \frac{1}{4}$$

Percent ⟶ Decimal ⟶ Fraction

35%	
Decimal	0.35
Fraction	$\frac{35}{100}$ simplifies to $\frac{7}{20}$
$35\% = 0.35 = \dfrac{7}{20}$	

Fraction ⟶ Percent ⟶ Decimal

$\frac{2}{5}$	
Percent	$\frac{2}{5} \times \frac{20}{20} = \frac{40}{100} = 40\%$
Decimal	$\frac{40}{100} = 0.40 = 0.4$
$\dfrac{2}{5} = 40\% = 0.4$	

Decimal ⟶ Fraction ⟶ Percent

0.03	
Fraction	$\frac{3}{100}$
Percent	3%
$0.03 = \dfrac{3}{100} = 3\%$	

Decimal Squares