

Fractions, Decimals and Percentages

Three ways to write the same amount. Learn the common ones by heart, then convert any value either way.

= Worth knowing by heart

$$\frac{1}{2} = 0.5 = 50\%$$

One half
 $1 \div 2 = 0.5$, and $0.5 \times 100 = 50\%$.

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

One quarter
Half of a half: $25/100$ simplified by 25.

$$\frac{3}{4} = 0.75 = 75\%$$

Three quarters
Three lots of 0.25.

$$\frac{1}{5} = 0.2 = 20\%$$

One fifth
 $1/5 = 2/10 = 20/100$.

$$\frac{1}{10} = 0.1 = 10\%$$

One tenth
Ten of them make the whole.

$$\frac{1}{8} = 0.125 = 12.5\%$$

One eighth
Half of a quarter: $0.25 \div 2 = 0.125$.

$$\frac{1}{3} = 0.333... \approx 33.3\%$$

One third
A recurring decimal: the 3s never end. Exactly $33 \frac{1}{3}\%$.

$$\frac{2}{3} = 0.666... \approx 66.7\%$$

Two thirds
Double $1/3$. Rounded to three decimal places it is 0.667.

↔ Converting each way

$$\frac{3}{8} = 3 \div 8 = 0.375$$

Fraction → decimal
Divide the numerator by the denominator.

$$0.35 = \frac{35}{100} = \frac{7}{20}$$

Decimal → fraction
Use place value: hundredths go over 100. Then simplify.

$$0.07 \times 100 = 7\%$$

Decimal → percentage
Multiply by 100. Digits move two places left.

$$4\% \div 100 = 0.04$$

Percentage → decimal
Divide by 100. 4% is 0.04, not 0.4.

$$45\% = \frac{45}{100} = \frac{9}{20}$$

Percentage → fraction
Write the percentage over 100, then simplify.

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

Fraction → percentage
Make the denominator 100, or divide and multiply by 100.

$$\frac{3}{40} = 0.075 \cdot \frac{1}{6} = 0.1666...$$

Will the decimal end?
Simplify first. Denominator made only of 2s and 5s: it ends. Any other prime factor: it recurs.



Ordering mixed forms

Put $3/5$, 0.62 and 61% in order by writing them all as decimals: 0.6, 0.62 and 0.61. Smallest to largest: $3/5$, 61%, 0.62.

NEXT IN THE SERIES

6. Common Fraction Mistakes

