Decimals, Fractions and Percentages

**Decimals, Fractions and Percentages are just different ways of showing the same value:**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| http://www.mathsisfun.com/images/fractions/pie-1-2.jpg | |  |  | | --- | --- | | **A Half** can be written... | | |  |  | | As a fraction: | 1/2 | | As a decimal: | 0.5 | | As a percentage: | 50% | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| http://www.mathsisfun.com/images/fractions/pie-1-4.jpg | |  |  | | --- | --- | | **A Quarter** can be written... | | |  |  | | As a fraction: | 1/4 | | As a decimal: | 0.25 | | As a percentage: | 25% | |

Here, have a play with it yourself:

|  |
| --- |
|  |
| [View Larger](javascript:FlashPHP(960,345,'numbers/images/frac-pct-dec.swf','#FFFFFF')) |

Example Values

Here is a table of commonly occuring values shown in Percent, Decimal and Fraction form:

|  |  |  |
| --- | --- | --- |
| Percent | Decimal | Fraction |
| 1% | 0.01 | 1/100 |
| 5% | 0.05 | 1/20 |
| 10% | 0.1 | 1/10 |
| 12½% | 0.125 | 1/8 |
| 20% | 0.2 | 1/5 |
| 25% | 0.25 | 1/4 |
| 331/3% | 0.333... | 1/3 |
| 50% | 0.5 | 1/2 |
| 75% | 0.75 | 3/4 |
| 80% | 0.8 | 4/5 |
| 90% | 0.9 | 9/10 |
| 99% | 0.99 | 99/100 |
| **100%** | **1** |  |
| 125% | 1.25 | 5/4 |
| 150% | 1.5 | 3/2 |
| 200% | 2 |  |

Conversions

From Percent to Decimal

To [convert from percent to decimal](http://www.mathsisfun.com/converting-percents-decimals.html): divide by 100, and remove the "%" sign.

The easiest way to divide by 100 is to **move the decimal point 2 places to the left**. So:

|  |  |  |
| --- | --- | --- |
| From Percent | To Decimal |  |
| http://www.mathsisfun.com/images/percent-to-decimal.gif | | move the decimal point **2 places to the left**, and remove the "%" sign. |

From Decimal to Percent

To [convert from decimal to percent](http://www.mathsisfun.com/converting-decimals-percents.html): multiply by 100, and add a "%" sign.

The easiest way to multiply by 100 is to **move the decimal point 2 places to the right**. So:

|  |  |  |
| --- | --- | --- |
| From Decimal | To Percent |  |
| http://www.mathsisfun.com/images/decimal-to-percent.gif | | move the decimal point **2 places to the right**, and add the "%" sign. |

From Fraction to Decimal

The easiest way to [convert a fraction to a decimal](http://www.mathsisfun.com/converting-fractions-decimals.html) is to divide the top number by the bottom number (divide the numerator by the denominator in mathematical language)

**Example: Convert**2**/**5**to a decimal**

Divide 2 by 5: 2 ÷ 5 = 0.4

**Answer:**2**/**5**= 0.4**

From Decimal to Fraction

To [convert a decimal to a fraction](http://www.mathsisfun.com/converting-decimals-fractions.html) needs a little more work.

**Example: To convert 0.75 to a fraction**

|  |  |
| --- | --- |
| **Steps** | **Example** |
| First, write down the decimal "over" the number 1 | 0.75 / 1 |
|  |  |
| Then multiply top and bottom by 10 for every number after the decimal point (10 for 1 number, 100 for 2 numbers, etc) | 0.75 × 100 / 1 × 100 |
| (This makes it a correctly formed fraction) | = 75 / 100 |
| Then [Simplify](http://www.mathsisfun.com/simplifying-fractions.html) the fraction | 3 / 4 |

From Fraction to Percentage

The easiest way to [convert a fraction to a percentage](http://www.mathsisfun.com/converting-fractions-percents.html) is to divide the top number by the bottom number. then multiply the result by 100, and add the "%" sign.

**Example: Convert**3**/**8**to a percentage**

First divide 3 by 8: 3 ÷ 8 = 0.375,  
Then multiply by 100: 0.375 x 100 = 37.5  
Add the "%" sign: 37.5%

**Answer:**3**/**8**= 37.5%**

From Percentage to Fraction

To [convert a percentage to a fraction](http://www.mathsisfun.com/converting-percents-fractions.html), first convert to a decimal (divide by 100), then use the steps for converting decimal to fractions (like above).

**Example: To convert 80% to a fraction**

|  |  |
| --- | --- |
| **Steps** | **Example** |
| Convert 80% to a decimal (=80/100): | 0.8 |
| Write down the decimal "over" the number 1 | 0.8 / 1 |
|  |  |
| Then multiply top and bottom by 10 for every number after the decimal point (10 for 1 number, 100 for 2 numbers, etc) | 0.8 × 10 / 1 × 10 |
| (This makes it a correctly formed fraction) | = 8 / 10 |
| Then [Simplify](http://www.mathsisfun.com/simplifying-fractions.html) the fraction | 4 / 5 |