Fraction	Decimal	Prime Factors of Denominator	Recurring or Terminating
$\frac{1}{2}$			
$\frac{1}{3}$			
$\frac{1}{4}$			
$\frac{1}{5}$			
$\frac{1}{6}$			
$\frac{1}{7}$			
$\frac{1}{8}$			
$\frac{1}{9}$			
$\frac{1}{10}$			
$\frac{1}{11}$			
$\frac{1}{12}$			
$\frac{1}{13}$			
$\frac{1}{14}$			
$\frac{1}{15}$			
$\frac{1}{16}$			
$\frac{1}{17}$			
$\frac{1}{18}$			
$\frac{1}{19}$			
$\frac{1}{20}$			

How to convert a **fraction** to a **decimal**:

Write as a division:	$\frac{3}{11} = 3 \div 11$
Use the 'bus-stop' method with lots of trailing zeroes (make sure the denominator goes on the outside):	$11 \overline{)3.0000000000}$
Begin the division, and continue until the *remainders* start to be repeated:	$11 \overline{)3.^{3}0^{8}0^{3}0^{8}000000}$ with quotient $0.2727\ldots$
Write the answer in recurring decimal form, with dots over the first and last digits in the repeating sequence:	$\frac{3}{11} = 0.\dot{2}\dot{7}$

How to convert a **'simple' recurring decimal** to a **fraction**:

Call the decimal x:	$x = 0.\dot{1}\dot{8}$
Multiply both sides by 10, 100 or 1000, etc, until one whole repeating section is moved to the left of the decimal point:	$100x = 18.\dot{1}\dot{8}$
Subtract x from one side and your original decimal from the other (we can do this since they are equal):	$99x = 18$
Divide through by the number in front of x to form a fraction with 9, 99 or 999 etc on the bottom:	$x = \frac{18}{99}$
Simplify as far as possible:	$\frac{18}{99} = \frac{2}{11}$

How to deal with more **complicated recurring decimals**:

If you have to simplify a recurring decimal which has a non-recurring part at the beginning, first multiply by a multiple of 10 until the non-recurring part is to the left of the decimal point and subtract the whole number part to leave a 'simple' recurring decimal:

$$0.1\dot{6} \times \mathbf{10} = 1.\dot{6} \qquad 1.\dot{6} - \mathbf{1} = 0.\dot{6}$$

Convert this 'simple' recurring decimal into a fraction using the standard method:

$$x = 0.\dot{6}$$

$$10x = 6.\dot{6}$$

$$9x = 6$$

$$x = \frac{6}{9} = \mathbf{\frac{2}{3}}$$

To find the original complex recurring decimal we need to reverse the steps we took to turn it into a simple one, and finally simplify:

$$\frac{2}{3} + \mathbf{1} = \frac{5}{3} \qquad \frac{5}{3} \div \mathbf{10} = \frac{5}{3} \times \frac{1}{10} = \frac{5}{30} = \mathbf{\frac{1}{6}}$$

Example: $\mathbf{2.04\dot{1}0\dot{8}}$

$$2.04\dot{1}0\dot{8} \times \mathbf{100} = 204.\dot{1}0\dot{8} \qquad 204.\dot{1}0\dot{8} - \mathbf{204} = 0.\dot{1}0\dot{8}$$

$$x = 0.\dot{1}0\dot{8}$$

$$1000x = 108.\dot{1}0\dot{8}$$

$$999x = 108$$

$$x = \frac{108}{999} = \frac{12}{111}$$

$$\frac{12}{111} + \mathbf{204} = \frac{22644}{111} + \frac{12}{111} = \frac{22656}{111}$$

$$\frac{22656}{111} \div \mathbf{100} = \frac{22656}{111} \times \frac{1}{100} = \frac{22656}{11100} = \frac{11328}{5550} = \frac{5644}{2775} = \mathbf{\frac{1888}{925}} \quad or \quad \mathbf{2\frac{38}{925}}$$

Fraction	Decimal	Prime Factors of Denominator	Recurring or Terminating
$\frac{1}{2}$	0.5	2	*Terminating*
$\frac{1}{3}$	$0.\dot{3}$	3	Recurring
$\frac{1}{4}$	0.25	2^2	*Terminating*
$\frac{1}{5}$	0.2	5	*Terminating*
$\frac{1}{6}$	$0.1\dot{6}$	2×3	Recurring
$\frac{1}{7}$	$0.\dot{1}42857\dot{}$	7	Recurring
$\frac{1}{8}$	0.125	2^3	*Terminating*
$\frac{1}{9}$	$0.\dot{1}$	3^2	Recurring
$\frac{1}{10}$	0.1	2×5	*Terminating*
$\frac{1}{11}$	$0.\dot{0}\dot{9}$	11	Recurring
$\frac{1}{12}$	$0.08\dot{3}$	$2^2 \times 3$	Recurring
$\frac{1}{13}$	$0.\dot{0}76923\dot{}$	13	Recurring
$\frac{1}{14}$	$0.0\dot{7}1428\dot{5}$	2×7	Recurring
$\frac{1}{15}$	$0.0\dot{6}$	3×5	Recurring
$\frac{1}{16}$	0.0625	2^4	Recurring
$\frac{1}{17}$	$0.\dot{0}5882352941176\dot{4}\dot{7}$	17	Recurring
$\frac{1}{18}$	$0.0\dot{5}$	2×3^2	Recurring
$\frac{1}{19}$	$0.\dot{0}52631578947368\dot{4}\dot{2}\dot{1}$	19	Recurring
$\frac{1}{20}$	0.05	$2^2 \times 5$	*Terminating*