

Fraction to Decimal Conversion

Important Note: any span of numbers that is underlined signifies that those numbers are repeated. For example, 0.09 signifies 0.090909.... **Only fractions in lowest terms are listed.** For instance, to find 2/8, first simplify it to 1/4 then search for it in the table below.

fraction = decimal			
1/1 = 1			
1/2 = 0.5			
1/3 = 0.<u>3</u>	2/3 = 0.<u>6</u>		
1/4 = 0.25	3/4 = 0.75		
1/5 = 0.2	2/5 = 0.4	3/5 = 0.6	4/5 = 0.8
1/6 = 0.1<u>6</u>	5/6 = 0.8<u>3</u>		
1/7 = 0.1<u>42857</u>	2/7 = 0.2<u>85714</u>	3/7 = 0.4<u>28571</u>	4/7 = 0.5<u>71428</u>
	5/7 = 0.7<u>14285</u>	6/7 = 0.8<u>57142</u>	
1/8 = 0.125	3/8 = 0.375	5/8 = 0.625	7/8 = 0.875
1/9 = 0.1<u>1</u>	2/9 = 0.2<u>2</u>	4/9 = 0.4<u>4</u>	5/9 = 0.5<u>5</u>
	7/9 = 0.7<u>7</u>	8/9 = 0.8<u>8</u>	
1/10 = 0.1	3/10 = 0.3	7/10 = 0.7	9/10 = 0.9
1/11 = 0.0<u>9</u>	2/11 = 0.1<u>8</u>	3/11 = 0.2<u>7</u>	4/11 = 0.3<u>6</u>
	5/11 = 0.4<u>5</u>	6/11 = 0.5<u>4</u>	7/11 = 0.6<u>3</u>
	8/11 = 0.7<u>2</u>	9/11 = 0.8<u>1</u>	10/11 = 0.9<u>0</u>
1/12 = 0.08<u>3</u>	5/12 = 0.41<u>6</u>	7/12 = 0.58<u>3</u>	11/12 = 0.91<u>6</u>
1/16 = 0.0625	3/16 = 0.1875	5/16 = 0.3125	7/16 = 0.4375
	11/16 = 0.6875	13/16 = 0.8125	15/16 = 0.9375
1/32 = 0.03125	3/32 = 0.09375	5/32 = 0.15625	7/32 = 0.21875
	9/32 = 0.28125	11/32 = 0.34375	13/32 = 0.40625
	15/32 = 0.46875	17/32 = 0.53125	19/32 = 0.59375
	21/32 = 0.65625	23/32 = 0.71875	25/32 = 0.78125
	27/32 = 0.84375	29/32 = 0.90625	31/32 = 0.96875

Need to convert a repeating decimal to a fraction? Follow these examples:

Note the following pattern for repeating decimals:

$$0.\underline{2}2222222... = 2/9$$

$$0.\underline{54}545454... = 54/99$$

$$0.\underline{298}298298... = 298/999$$

Division by 9's causes the repeating pattern.

Note the pattern if zeros precede the repeating decimal:

$$0.0\underline{2}2222222... = 2/90$$

$$0.000\underline{54}545454... = 54/99000$$

$$0.00\underline{298}298298... = 298/99900$$

Adding zero's to the denominator adds zero's before the repeating decimal.

To convert a decimal that begins with a non-repeating part, such as

0.21456456456456456..., to a fraction, write it as the sum of the non-repeating part and the repeating part.

$$0.21 + 0.00\underline{456}456456456...$$

Next, convert each of these decimals to fractions. The first decimal has a divisor of power ten.

The second decimal (which repeats) is converted according to the pattern given above.

$$21/100 + 456/99900$$

Now add these fraction by expressing both with a common divisor

$$20979/99900 + 456/99900$$

and add.

$$21435/99900$$

Finally simplify it to lowest terms

$$1429/6660$$

and check on your calculator or with long division.

$$= 0.2145645645...$$