

Conversion of Fractions

RULE 5. Common Fractions.

Simply convert the numerator and the denominator separately as whole numbers. Examples:

$$\frac{3}{4} \text{ decimal} = \frac{3}{4} \text{ dozenal}, \quad \frac{75}{144} \text{ decimal} = \frac{63}{100} \text{ dozenal}$$

RULE 6. DECIMAL TO DOZENAL.

STEP 1. Multiply the fractional by $\#12$ and set aside the last figure carried, as the first figure of the answer.

STEP 2. Multiply the remaining fractional by $\#12$, and set off the last figure, as before.

STEP 3. Continue to as many places as the original fractional. If the remaining fractional is greater than $\#0.5$, add 1 to the final figure of your result.

Examples: Convert the following decimal numbers to dozenal.

$\begin{array}{r} \#.8247 \\ \times 12 \\ \hline 9 \ .8964 \\ \times 12 \\ \hline 7 \ .7568 \\ \times 12 \\ \hline 9 \ .0816 \\ \times 12 \\ \hline 0 \ .9792 \\ \hline \#.9792 > \#0.5 \\ \text{ANSWER: } \#0.9\#791 \end{array}$	$\begin{array}{r} \#.04167 \\ \times 12 \\ \hline 0 \ .50004 \\ \times 12 \\ \hline 6 \ .00048 \\ \times 12 \\ \hline 0 \ .00576 \\ \times 12 \\ \hline 0 \ .06192 \\ \times 12 \\ \hline 0 \ .82944 \\ \hline \#.82944 > \#0.5 \\ \text{ANSWER: } \#0.06001 \end{array}$	$\begin{array}{r} \#.015625 \\ \times 12 \\ \hline 0 \ .187500 \\ \times 12 \\ \hline 2 \ .250000 \\ \times 12 \\ \hline 3 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \hline \#.000000 < \#0.5 \\ \text{ANSWER: } \#0.023 \end{array}$
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RULE 7. DOZENAL TO DECIMAL.

STEP 1. Multiply the fractional by τ and set aside the last figure carried, as the first figure of the answer.

STEP 2. Multiply the remaining fractional by τ , and set off the last figure, as before.

STEP 3. Continue to as many places as the original fractional. If the remaining fractional is greater than $\#0.6$, add 1 to the final figure of your result.

Examples: Convert the following dozenal numbers to decimal.

$\begin{array}{r} \#.9\#791 \\ \times \tau \\ \hline 8 \ .2\#6\# \\ \times \tau \\ \hline 2 \ .5784 \\ \times \tau \\ \hline 4 \ .84\#4 \\ \times \tau \\ \hline 7 \ .0154 \\ \hline \#.0154 > \#0.6 \\ \text{ANSWER: } \#0.8247 \end{array}$	$\begin{array}{r} \#.49725 \\ \times \tau \\ \hline 4 \ .00002 \\ \times \tau \\ \hline 0 \ .00018 \\ \times \tau \\ \hline 0 \ .00128 \\ \times \tau \\ \hline 0 \ .00\#48 \\ \times \tau \\ \hline 0 \ .095\#8 \\ \hline \#.095\#8 > \#0.6 \\ \text{ANSWER: } \#0.40000 \end{array}$	$\begin{array}{r} \#.023000 \\ \times \tau \\ \hline 0 \ .1\#6000 \\ \times \tau \\ \hline 1 \ .690000 \\ \times \tau \\ \hline 5 \ .760000 \\ \times \tau \\ \hline 6 \ .300000 \\ \times \tau \\ \hline 2 \ .600000 \\ \times \tau \\ \hline 5 \ .000000 \\ \hline \#.000000 < \#0.6 \\ \text{ANSWER: } \#0.015625 \end{array}$
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Conversion of Mixed Numbers

For mixed numbers, the simplest way will usually be to convert the whole number and the fractional separately. But there is a method for converting mixed numbers that employs only the rules for conversion of integers.² This method facilitates writing software or building machines to convert between bases.

RULE 8. DECIMAL TO DOZENAL.

STEP 1. Ignore the fraction point, and convert as a whole number.

STEP 2. Divide the result by τ as many times as there places in the fractional.

Examples: Convert the following decimal numbers to dozenal.

$\begin{array}{r} \#27.84 \\ 2784. \text{ (2 PLACES)} \\ \rightarrow 1740.00 \\ \tau \overline{)1740.00} \\ \tau \underline{1\#2.4\tau} \\ \#23.71 \text{ ANSWER} \end{array}$	$\begin{array}{r} \#34.567 \\ 34567. \text{ (3 PLACES)} \\ \rightarrow 18007.000 \\ \tau \overline{)18007.000} \\ \tau \underline{2000.84\tau} \\ \tau \underline{249.806} \\ \#27.698 \text{ ANSWER} \end{array}$	$\begin{array}{r} \#144.25 \\ 14425. \text{ (2 PLACES)} \\ \rightarrow 8421.00 \\ \tau \overline{)8421.00} \\ \tau \underline{702.60} \\ \#100.30 \text{ ANSWER} \end{array}$
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RULE 9. DOZENAL TO DECIMAL.

STEP 1. Ignore the fraction point, and convert as a whole number.

STEP 2. Divide the result by $\#12$ as many times as are places in the fractional.

Examples: Convert the following dozenal numbers to decimal.

$\begin{array}{r} \#23.71 \\ 23\#1. \text{ (2 PLACES)} \\ \rightarrow 4009.00 \\ 12 \overline{)4009.00} \\ 12 \underline{334.08} \\ \#27.84 \text{ ANSWER} \end{array}$	$\begin{array}{r} \#27.698 \\ 2\#698. \text{ (3 PLACES)} \\ \rightarrow 59732.000 \\ 12 \overline{)59732.000} \\ 12 \underline{4977.667} \\ 12 \underline{414.806} \\ \#34.567 \text{ ANSWER} \end{array}$	$\begin{array}{r} \#100.30 \\ 10030. \text{ (2 PLACES)} \\ \rightarrow 20772.00 \\ 12 \overline{)20772.00} \\ 12 \underline{1731.00} \\ \#144.25 \text{ ANSWER} \end{array}$
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Practice

Try the following exercises. Answers are printed below, upside down.

Convert DECIMAL TO DOZENAL.

3455	72,057	0.875
78.125	840.56	3.14159

Convert DOZENAL TO DECIMAL.

$\tau,323$	200,10 $\#$	0.12497
1.5	2.875	$\#7.987$

NOTES

1. This method was "originally suggested by Robert Morris Pierce ($\#1898$), and recently recommended by Nelson B. Gray." (DUODECIMAL SOCIETY OF AMERICA, *Manual of the Dozen System*, $\#1960$, page $\#1\tau$.)

2. This floating point method was developed by Member Howard Seely. (DUODECIMAL SOCIETY OF AMERICA, *Manual of the Dozen System*, $\#1960$, page $\#20$.)

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00001	2718	14
010000	497819	17,739
08480	52069	66160
0920	35,849	3331
Convert DECIMAL TO DOZENAL.	Convert DOZENAL TO DECIMAL.	

Answers

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