

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.

$\begin{array}{r} .8247 \\ \times 12 \\ \hline 9 \ .8964 \\ \times 12 \\ \hline \chi \ .7568 \\ \times 12 \\ \hline 9 \ .0816 \\ \times 12 \\ \hline 0 \ .9792 \\ \hline .9792 > 0.5 \\ \text{ANSWER: } 0;9\chi91 \end{array}$	$\begin{array}{r} .04167 \\ \times 12 \\ \hline 0 \ .50004 \\ \times 12 \\ \hline 6 \ .00048 \\ \times 12 \\ \hline 0 \ .00576 \\ \times 12 \\ \hline 0 \ .06192 \\ \times 12 \\ \hline 0 \ .82944 \\ \hline .82944 > 0.5 \\ \text{ANSWER: } 0;06001 \end{array}$	$\begin{array}{r} .015625 \\ \times 12 \\ \hline 0 \ .187500 \\ \times 12 \\ \hline 2 \ .250000 \\ \times 12 \\ \hline 3 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \times 12 \\ \hline 0 \ .000000 \\ \hline .000000 < 0.5 \\ \text{ANSWER: } 0;023 \end{array}$
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RULE 7. DOZENAL TO DECIMAL.

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

STEP 2. Multiply the remaining fractional by χ , 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.

$\begin{array}{r} ;9\chi91 \\ \times \chi \\ \hline 8 \ ;2\epsilon6\chi \\ \times \chi \\ \hline 2 \ ;5784 \\ \times \chi \\ \hline 4 \ ;84\epsilon4 \\ \times \chi \\ \hline 7 \ ;0154 \\ \hline ;0154 > 0;6 \\ \text{ANSWER: } 0.8247 \end{array}$	$\begin{array}{r} ;49725 \\ \times \chi \\ \hline 4 \ ;00002 \\ \times \chi \\ \hline 0 \ ;00018 \\ \times \chi \\ \hline 0 \ ;00128 \\ \times \chi \\ \hline 0 \ ;00\epsilon48 \\ \times \chi \\ \hline 0 \ ;095\chi8 \\ \hline ;095\chi8 > 0;6 \\ \text{ANSWER: } 0.40000 \end{array}$	$\begin{array}{r} ;023000 \\ \times \chi \\ \hline 0 \ ;1\chi6000 \\ \times \chi \\ \hline 1 \ ;690000 \\ \times \chi \\ \hline 5 \ ;760000 \\ \times \chi \\ \hline 6 \ ;300000 \\ \times \chi \\ \hline 2 \ ;600000 \\ \times \chi \\ \hline 5 \ ;000000 \\ \hline ;000000 < 0;6 \\ \text{ANSWER: } 0.015625 \end{array}$
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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 χ as many times as there places in the fractional.

Examples: Convert the following decimal numbers to dozenal.

$\begin{array}{r} 2784 \\ \hline 2784. \text{ (2 PLACES)} \\ \rightarrow 1740;00 \\ \chi) 1740;00 \\ \chi) \underline{1\epsilon2;4\chi} \\ 23;\chi1 \text{ ANSWER} \end{array}$	$\begin{array}{r} 34.567 \\ \hline 34567. \text{ (3 PLACES)} \\ \rightarrow 18007;000 \\ \chi) 18007;000 \\ \chi) \underline{2000;84\chi} \\ \chi) \underline{249;806} \\ 2\chi;698 \text{ ANSWER} \end{array}$	$\begin{array}{r} 144.25 \\ \hline 14425. \text{ (2 PLACES)} \\ \rightarrow 8421;00 \\ \chi) 8421;00 \\ \chi) \underline{\chi02;60} \\ 100;30 \text{ ANSWER} \end{array}$
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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 there places in the fractional.

Examples: Convert the following dozenal numbers to decimal.

$\begin{array}{r} 23;\chi1 \\ \hline 23\chi1; \text{ (2 PLACES)} \\ \rightarrow 4009.00 \\ 12) 4009.00 \\ 12) \underline{334.08} \\ 27.84 \text{ ANSWER} \end{array}$	$\begin{array}{r} 2\chi;698 \\ \hline 2\chi698; \text{ (3 PLACES)} \\ \rightarrow 59732.000 \\ 12) 59732.000 \\ 12) \underline{4977.667} \\ 12) \underline{414.806} \\ 34.567 \text{ ANSWER} \end{array}$	$\begin{array}{r} 100;30 \\ \hline 10030; \text{ (2 PLACES)} \\ \rightarrow 20772.00 \\ 12) 20772.00 \\ 12) \underline{1731.00} \\ 144.25 \text{ ANSWER} \end{array}$
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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.

$\chi,323$	200,10 ϵ	0;12497
1;5	2;875	$\epsilon\chi;987$

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 χ .)

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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142.810	2.718	1.4
0.10000	497819	17,739
Convert DOZENAL to DECIMAL.		
3;18480	5 χ 0;69	091;69
09 χ ;0	35,849	3331
Convert DECIMAL to DOZENAL.		

Answers