Difficulty with Decimals? Self-Help Guide!

Dividing Decimals

Recall that division is often introduced as the process which determines how many times one number will "go into" another. For example, how many quarters are there in one dollar, or in other words, what is $1 \div 0.25$? Obviously there are four quarters in a dollar which means that $1 \div 0.25 = 4$ (see Example 13). Because it is possible to confuse operations with decimals, always determine if the process used produces a reasonable answer. Recall that division is the inverse operation of multiplication. It is possible to verify the answer by multiplying the answer (quotient) by the divisor to show that it produces the dividend.

If there is a decimal point in the dividend only, the decimal point in the quotient will be in that same position vertically (see Example 12). If there is a decimal in the divisor, simplify the process by multiplying by a power of 10 to convert the decimal in the divisor to a whole number. Multiplying the divisor by a power of 10 means that the dividend must also be multiplied by that same number. Recall that multiplying by a power of ten moves the decimal point. If the decimal point in the divisor moves to the right, then the decimal point in the dividend must move the same number of place values to the right (see Examples 13 – 16).

Example #12: 4.32 ÷ 4

Dividend, Divisor, Quotient

$4.32 \div 4 = \frac{4.32}{4} = 4\overline{)4.32} = 4\overline{)4!32}\ \begin{matrix}1.08\\ \uparrow\end{matrix}$

Example #13: 1 ÷ 0.25

$1 \div 0.25 = \frac{1}{0.25} = 0.25\overline{)1.} = 25\overline{)100.} = 25\overline{)100.} = 25\overline{)100}\ \begin{matrix}4\\ \uparrow\end{matrix}$

(Add zeros as place holders.)

Example #14: 0.025 ÷ 0.5

$0.025 \div 0.5 = \frac{0.025}{0.5} = 0.5\overline{)0.025} = 5\overline{)00.25} = 5\overline{)0.25} = 5\overline{)0!25}\ \begin{matrix}.05\\ \uparrow\end{matrix}$

Example #15: 40 ÷ 0.05

$40 \div 0.05 = \frac{40}{0.05} = 0.05\overline{)40} = 05.\overline{)4000.} = 5\overline{)4000.} = 5\overline{)4000}\ \begin{matrix}800\\ \uparrow\end{matrix}$

(Add zeros as place holders.)

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At times, it may be necessary to use long division as shown in the example below.

Example #16: 32.6 ÷ 0.08

$$32.6 \div 0.08 = \frac{32.6}{0.08} = 0.08\overline{)32.6} = 08\overline{)3260.} = 8\overline{)3260.}$$

The long division process is shown below.

(Add zero as a place holder.)

Step 1:	Step 2:	Step 3:	Step 4:
Approximate 32 ÷ 8 which is 4. Place this number above the division bar.	Multiply 4 • 8 and place product below 32.	Subtract 32 – 32 = 0.	Bring down the next digit 6.

```
   4          4          4          4
8)3260.    8)3260.    8)3260.    8)3260.
           - 32       - 32       - 32
             0          0         06
```

Now begin the process again.

Repeat steps 1 – 4 until quotient terminates, repeats or is rounded to a given place value.

```
  40         40         40         40
8)3260.    8)3260.    8)3260.    8)3260.
- 32        - 32       - 32       - 32
   6          6          6          6
              0        - 0        - 0
                         6         60
```

```
  407        407        407        407
8)3260.    8)3260.    8)3260.    8)3260.0
- 32        - 32       - 32       - 32
   6          6          6          6
 - 0        - 0        - 0        - 0
  60         60         60         60
             56        - 56       - 56
                         4         40
```

Add zero as a place holder.

```
  407.5      407.5      407.5
8)3260.0   8)3260.0   8)3260.0
- 32        - 32       - 32
   6          6          6
 - 0        - 0        - 0
  60         60         60
 - 56       - 56       - 56
   40         40         40
              40        - 40
                          0
```

← Division is now finished, because the remainder is zero.

If necessary, continue adding zeros to the right of the decimal point in the dividend until the quotient decimal terminates (remainder is 0), repeats or is rounded to a given place value. To divide repeating decimals, convert the repeating decimals to fractions (see Example 2).