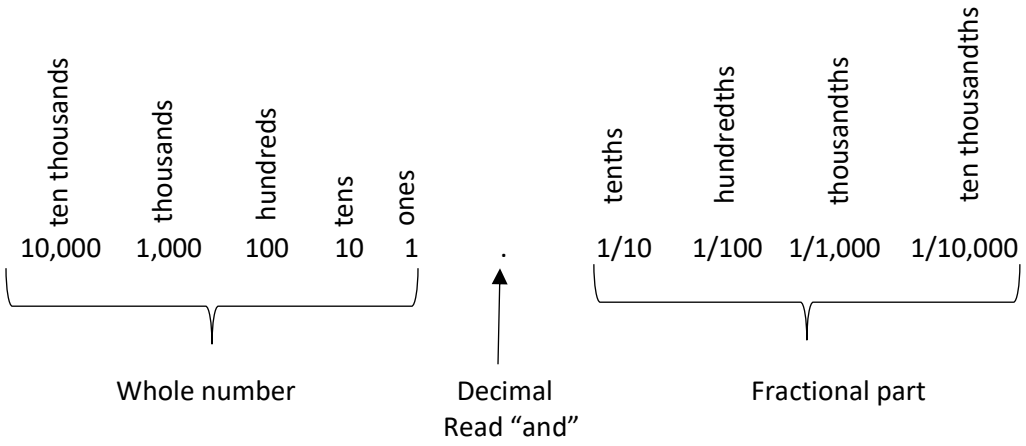
Decimals Cheat Sheet

Decimal Place Value Chart



1. Reading and Writing Decimal Numbers:

a. Reading
   i. Read any whole number parts to the left of the decimal point as you normally would (if any)
   ii. Read the decimal point as "and"
   iii. Read the number to the right of the decimal point as if it were an ordinary whole number
   iv. Finish with the place value name of the right most digit (these names all end with "ths")

   Examples: 0.49 → forty-nine hundredths
   6.08 → six and eight hundredths
   0.063 → sixty-three thousandths

b. Writing decimals as fractions
   i. The digits to the rights of the decimals point are the numerator
   ii. The denominator is 10 for tenths, 100 for hundredths, etc.
   iii. If the decimal has a while number, it is written as a mixed number

   Example:

$0.3 \rightarrow \frac{3}{10}$ $16.9 \rightarrow 16\frac{9}{10}$

$0.83 \rightarrow \frac{83}{100}$ $1.04 \rightarrow 1\frac{4}{100} \rightarrow 1\frac{1}{25}$

write fractions in lowest terms

2. Rounding Decimal Numbers:

a. Determine which place value you are rounding to
b. Look at the digit one place to the right
c. If the number is 4 or lower, the digit stays the same and the rest turn to zero (round down)
d. If the number is 5 or higher, round up

Example: 14.39652 to the nearest thousandths = 14.397
$5.3496 to the nearest cent = $5.35
48.69 to the nearest whole number = 49
$0.68 to the nearest dollar = $1

3. Adding and Subtracting Decimals:

a. Write the numbers in columns with the decimals lined up
b. If necessary, write in zeros so both numbers have the same number of decimal places
c. Add or subtract the same as you would with whole numbers
d. Line up the decimal point in the answer directly below the decimal points in the problem

Example: $16.92 + 48.34$

$$\begin{array}{r} {\scriptstyle 1\,1} \\ 16.92 \\ +\,48.34 \\ \hline 65.26 \end{array}$$

$6.42 + 9 + 2.576$

$$\begin{array}{r} 6.420 \\ 9.000 \\ +\ 2.576 \\ \hline 17.996 \end{array}$$

Add zeros to have the same amount of decimal digits

$28.362 - 16.5$

$$\begin{array}{r} {\scriptstyle 7\ \ 1} \\ 28.362 \\ -\ 16.500 \\ \hline 11.862 \end{array}$$

$59.7 - 38.914$

$$\begin{array}{r} {\scriptstyle 1\ \ 9} \\ {\scriptstyle 8\ \ \cancel{6}\ \cancel{10}\ 10} \\ 5\cancel{9}.\cancel{700} \\ -\ 38.914 \\ \hline 20.786 \end{array}$$

4. Estimating:

a. Round each number to the nearest whole number
b. Add or subtract

Example: 3.25 rounds to 3
0.813 rounds to 1
2.83 + 5.009 + 76.1

Estimate	Exact
3	2.830
5	5.009
+ 80	+ 76.100
88	83.939

5. Multiplying Decimal Numbers:

a. Multiply the numbers as if they were whole numbers
b. Find the total number of decimal places in both factors
c. Write the decimal point in the answer so it has the same amount of decimal places as your total in step 2
*you may need to write in extra zeros on the left side of the answer to get the right number of decimal places

Example:

```
  8.34   ⎫
x 4.2    ⎭ ← three decimal places
 1668
33360
25.028 ← three decimal places
```

$(0.03)^2 = 0.03 \times 0.03 = 0.0009$

```
  0.042 ← five decimal places
x 0.03
  0126

= 0.00126 ← five decimal places
```

6. Dividing Decimal Numbers:

a. Dividing Decimals by a Whole Number
   i. Write the decimal point in the quotient (answer) directly above the decimal point in the dividend
   ii. Divide as if both were whole numbers

Example:

$21.93 \div 3 \longrightarrow$

```
   7.31
3 21.93
 -21
  09
  -9
  03
  -3
   0
```

   iii. You can add zeros to the right of your numbers to complete the division (there are no remainders)

Example:

$1.5 \div 8 \longrightarrow$

```
   .1875
8 1.5000
 -8
  70
 -64
  60
 -56
  40
 -40
   0
```

iv. When asked to round, go to one place value past digit you are rounding to

Example:

$4.7 \div 3$ round to nearest thousandth →

```
      1.5666
  3 | 4.7000
     -3
      17
     -15
       20
      -18
        20
       -18
         20
        -18
          2
         -2
          0
```

b. Dividing by a Decimal Number

i. Count the number of decimal places in the divisor and move the decimal point that many places to the right. *this changes the divisor to a whole number*

ii. Move the decimal point in the dividend the same number of places to the right. (Write in extra zeros if necessary)

iii. Write the decimal point in the quotient directly above the decimal point in the dividend

iv. Divide as usual

Example:

$27.690 \div 0.003$ →

```
      9230.
  3 | 27690.
     -27
      06
      -6
       09
        9
        00
        -0
         0
```

$5 \div 4.2$ rounded to the nearest hundredth

$5 \div 4.2$ →

```
       1.1904
  42 | 50.0000
      -42
        80
       -42
       380
      -378
         20
         -0
        200
       -168
          2
```

7. Order of Operations:

Brackets
Exponents
Division
Multiplication
Addition
Subtraction

Do all operations in order of BEDMAS to solve a problem

Example:

$$2.5 + 6.3^2 + 9.62$$

$$6.3 \times 6.3$$

$$2.5 + 39.69 + 9.62 = 51.81$$

$$1.82 + (6.7 - 5.2)(5.8)$$

$$1.82 + 1.5 \times 5.8$$

$$1.82 + 8.7 = 10.52$$

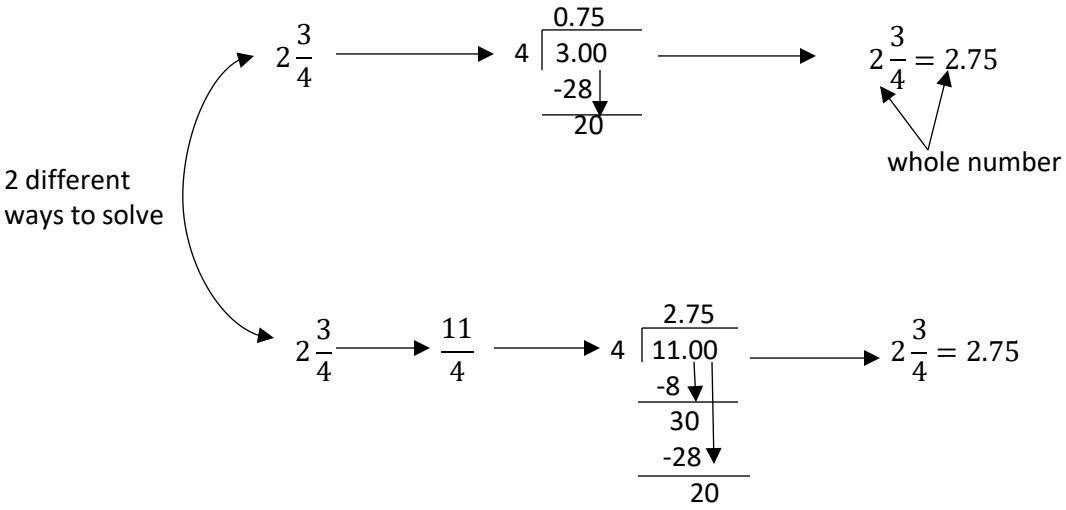
8. Fractions as Decimals:

a. Divide the numerator of a fraction by the denominator
b. If necessary, round to the place indicated

Example:

$$\frac{1}{8} \longrightarrow 8\overline{)1.000} = 0.125 \longrightarrow \frac{1}{8} = 0.125$$

```
    0.125
8 | 1.000
   -8
   ---
    20
   -16
   ---
     40
```


2 different ways to solve
$2\frac{3}{4}$
4 | 0.75
3.00
-28
20
$2\frac{3}{4} = 2.75$
whole number
$2\frac{3}{4}$
$\frac{11}{4}$
4 | 2.75
11.00
-8
30
-28
20
$2\frac{3}{4} = 2.75$