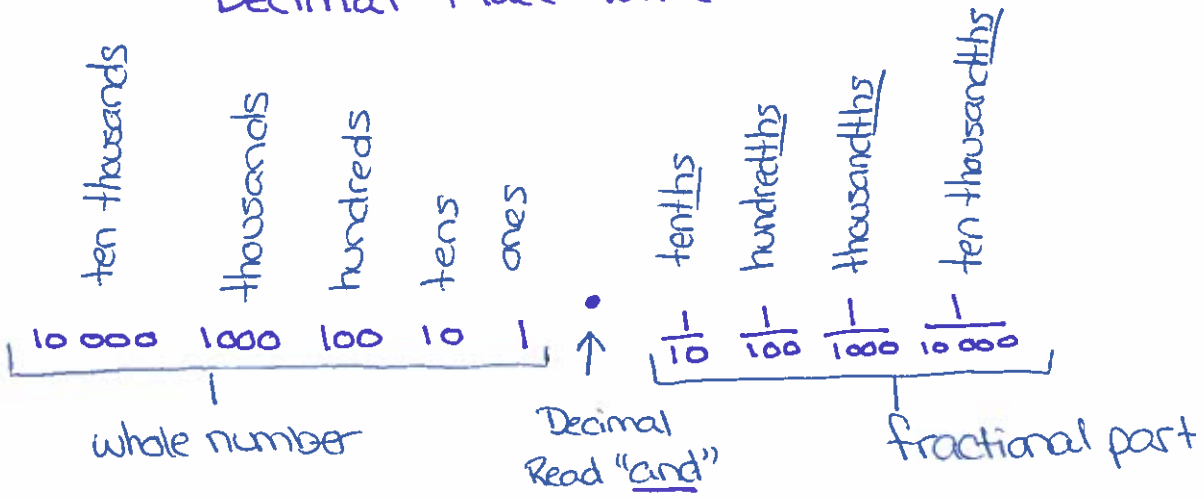
Decimals
Cheat Sheet

Decimal Place Value Chart



1. Reading and Writing Decimal Numbers:

1. Reading

- Read any whole number parts to the left of the decimal point as you normally would (if any).
- Read the decimal point as "and".
- Read the number to the right of the decimal point as if it were an ordinary whole number.
- Finish with the place value name of the rightmost digit. (These names all end with "ths.")

examples: 0.49 -> forty-nine hundredths

6.08 -> six and eight hundredths

0.063 -> sixty-three thousandths

2. Writing decimals as fractions:

- The digits to the right of the decimal point are the numerator (top number)
- The denominator is 10 for tenths, 100 for hundredths, etc.
- If the decimal has a whole number, it is written as a mixed number.

examples: $0.3 \to \frac{3}{10}$ $16.9 \to 16\frac{9}{10}$

$0.83 \to \frac{83}{100}$ $1.04 \to 1\frac{4}{100} = 1\frac{1}{25}$ ← write fraction in lowest terms!

2. Rounding Decimal Numbers:

1. Determine which place value you are rounding to.
2. Look at the digit one place to the right.
3. If the number is 4 or lower, the digit stays the same and the rest turn to zeros. (round down)
4. If the number is 5 or higher, round up.

Examples: 14.39652 to nearest thousandth = 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

Adding and Subtracting Decimals

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

Examples: 16.92 + 48.34

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

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

← add zeros to have same amount of decimal digits.

$$\begin{array}{r} {}^{7}\cancel{8}.362 \\ -\ 16.500 \\ \hline 11.862 \end{array}$$

59.7 − 38.914

$$\begin{array}{r} {}^{8}\cancel{5}\cancel{9}.{}^{16}\cancel{7}{}^{9}\cancel{0}{}^{10}\cancel{0} \\ -\ 38.914 \\ \hline 20.786 \end{array}$$

4. Estimating:

1. Round each number to the nearest whole number.
2. Add or Subtract.

Examples: 3.25 rounds to 3

0.812 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:

1. Multiply the numbers as if they were whole numbers.
2. Find the total number of decimal places in both factors.
3. 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.

Examples:

$$\begin{array}{r} 8.34 \\ \times\ 4.2 \\ \hline 1668 \\ 33360 \\ \hline 25.028 \end{array}$$

← 3 decimal places

← 3 decimal places

$$\begin{array}{r} 0.0412 \\ \times\ 0.03 \\ \hline 00126 \end{array}$$

← 5 decimal places

= 0.00126 ← 5 decimal places.

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

$$\begin{array}{r} 0.03 \\ \times\ 0.03 \\ \hline 009 \end{array}$$

6. Dividing Decimal Numbers:

1. Dividing Decimals by a Whole Number

1. Write the decimal point in the quotient (answer) directly above the decimal point in the divident.
2. Divide as if both were whole numbers.

Example: $21.93 \div 3 \rightarrow$

$$
\begin{array}{r}
7.31 \\
3\overline{)21.93} \\
-21\downarrow \\
\hline
09 \\
-9\downarrow \\
\hline
03 \\
3 \\
\hline
0
\end{array}
$$

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

Example:

$$
\begin{array}{r}
.1875 \\
8\overline{)1.5000} \\
-8\downarrow \\
\hline
70 \\
-64\downarrow \\
\hline
60 \\
-56\downarrow \\
\hline
40 \\
-40 \\
\hline
0
\end{array}
$$

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

Example: 4.7 ÷ 3 round to nearest thousandth

$$
\begin{array}{r}
1.5666 \\
3\overline{)4.7000} \\
-3\downarrow \\
\hline
17 \\
-15\downarrow \\
\hline
20 \\
-18\downarrow \\
\hline
20 \\
-18 \\
\hline
20 \\
-18 \\
\hline
\end{array}
\qquad = 1.567
$$

2. Dividing by a Decimal Number

1. 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 *
2. Move the decimal point ~~the~~ in the dividend the same number of places to the right. (Write in extra zeros if necessary.)
3. Write the decimal point in the quotient directly above the decimal point in the dividend.
4. Divide as usual.

Examples: $0.003\overline{)27.690} = 3\overline{)27690.}$

$$
\begin{array}{r}
9230. \\
3\overline{)27690.} \\
-27\downarrow \\
\hline
06 \\
-6\downarrow \\
\hline
09 \\
-9\downarrow \\
\hline
00 \\
-\ 0 \\
\hline
0
\end{array}
$$

$5 \div 4.2$, rounded to nearest hundredth.

$4.2\overline{)5} = 42\overline{)50.0000} = 1.190$

$$
\begin{array}{r}
1.1904 \\
42\overline{)50.0000} \\
-42\downarrow \\
\hline
80 \\
-42\downarrow \\
\hline
380 \\
-378\downarrow \\
\hline
20 \\
-\ 0\downarrow \\
\hline
200 \\
-168 \\
\hline
32
\end{array}
$$

7. Order of Operations:

Brackets
Exponents
Division
Multiplication
Addition
Subtraction

} Do all operations in order of BEDMAS to solve a problem.

Examples: $2.5 + 6.3^2 + 9.62$

6.3×6.3

$2.5 + 39.69 + 9.62 = 51.81$

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

$1.82 + 1.5 \times 5.8$

$1.82 + 8.7 = 10.52$

8. Fractions as Decimals:

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

Examples: $\frac{1}{8} \rightarrow$

$$\begin{array}{r} 0.125 \\ 8\overline{)1.000} \\ -8\downarrow \\ \hline 20 \\ -16\downarrow \\ \hline 40 \end{array}$$

$\frac{1}{8} = 0.125$

$2\frac{3}{4} \rightarrow$

$$\begin{array}{r} 0.75 \\ 4\overline{)3.00} \\ -28\downarrow \\ \hline 20 \end{array}$$

whole number

$2\frac{3}{4} = 2.75$

2 different ways to solve

OR

$2\frac{3}{4} = \frac{11}{4} \rightarrow$

$$\begin{array}{r} 2.75 \\ 4\overline{)11.00} \\ -8\downarrow \\ \hline 30 \\ -28\downarrow \\ \hline 20 \end{array}$$

$2\frac{3}{4} = 2.75$