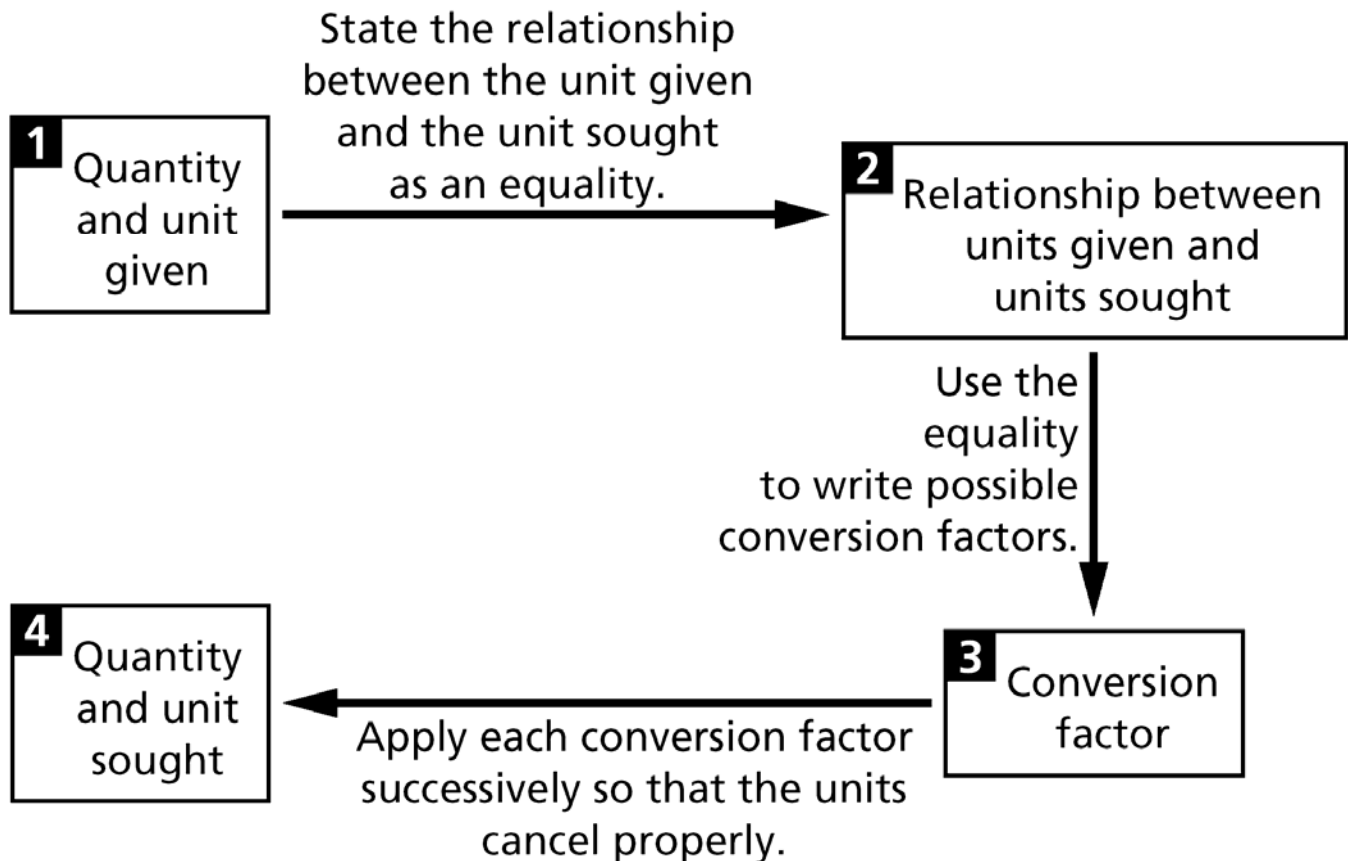


# Measurements Reference Sheet

Prefix	Unit abbreviation	Exponential factor	Meaning	Example
Tera	T	$10^{12}$	1 000 000 000 000	1 terameter (Tm) = $1 \times 10^{12}$ m
Giga	G	$10^9$	1 000 000 000	1 gigometer (Gm) = $1 \times 10^9$ m
Mega	M	$10^6$	1 000 000	1 megameter (Mm) = $1 \times 10^6$ m
Kilo	k	$10^3$	1000	1 kilometer (km) = 1000 m
Hecto	h	$10^2$	100	1 hectometer (hm) = 100 m
Deka	da	$10^1$	10	1 decameter (dam) = 10 m
		<b><math>10^0</math></b>	<b>1</b>	<b>1 meter (m)</b>
Deci	d	$10^{-1}$	1/10	1 decimeter (dm) = 0.1 m
Centi	c	$10^{-2}$	1/100	1 centimeter (cm) = 0.01 m
Milli	m	$10^{-3}$	1/1000	1 millimeter (mm) = 0.001 m
Micro	$\mu$	$10^{-6}$	1/1 000 000	1 micrometer ( $\mu$ m) = $1 \times 10^{-6}$ m
Nano	n	$10^{-9}$	1/1 000 000 000	1 nanometer (nm) = $1 \times 10^{-9}$ m
Pico	p	$10^{-12}$	1/1 000 000 000 000	1 picometer (pm) = $1 \times 10^{-12}$ m
Femto	f	$10^{-15}$	1/1 000 000 000 000 000	1 femtometer (fm) = $1 \times 10^{-15}$ m
Atto	a	$10^{-18}$	1/1 000 000 000 000 000 000	1 attometer (am) = $1 \times 10^{-18}$ m

## General Plan for Converting Measurements



# Significant Digits

Rule	Examples
1. Zeros between other nonzero digits are significant.	<p>a. 50.3 m has three significant figures.</p> <p>b. 3.0025 s has five significant figures.</p>
2. Zeros in front of nonzero digits are not significant.	<p>a. 0.892 kg has three significant figures.</p> <p>b. 0.0008 ms has one significant figure.</p>
3. Zeros that are at the end of a number and also to the right of the decimal are significant.	<p>a. 57.00 g has four significant figures.</p> <p>b. 2.000 000 kg has seven significant figures.</p>
4. Zeros at the end of a number but to the left of a decimal are significant if they have been measured or are the first estimated digit; otherwise, they are <i>not</i> significant. In this book, they will be treated as <i>not</i> significant.	<p>a. 1000 m may contain from one to four significant figures, depending on the precision of the measurement, but in this book it will be assumed that measurements like this have one significant figure.</p> <p>b. 20 m may contain one or two significant figures, but in this book it will be assumed to have one significant figure.</p>

Type of calculation	Rule	Example
addition or subtraction	The final answer should have the same number of digits to the right of the decimal as the measurement with the <i>smallest</i> number of digits <i>to the right of the decimal</i> .	$\begin{array}{r} 97.3 \\ + 5.85 \\ \hline 103.15 \end{array} \text{ round off } 103.2$
multiplication or division	The final answer has the same number of significant figures as the measurement having the <i>smallest</i> number of <i>significant figures</i> .	$\begin{array}{r} 123 \\ \times 5.35 \\ \hline 658.05 \end{array} \text{ round off } 658$