

There will not be any complicated analysis or advanced mathematics in the presentation and evaluation of astronomy in this course.

There is no formal

Mathematics Requirement (1 of 2), but...

skill in mathematics is an essential ingredient in a scientific view of the Universe.

Here are some specific skills you are expected to use:

Lists

You have to know how to put things in order in a list. For instance, take the list on page 194 of the textbook and rearrange it in **order of diameter**.

Big Numbers

Astronomy requires perspective and balance. The human mind boggles at the scales involved in astronomy. The only way to make meaningful comparisons is to use **numbers**—properly! Read the paragraph "Billions and Billions" on page 17 of the textbook.

Multiply

Look for the diameter of the earth, expressed in kilometres or metres, and **calculate** the diameters of all the other planets, based on the first column in the table on page 194.

Speed

The famous formula is $\text{speed} = \text{distance} \div \text{time}$. You have to be able to **solve** this equation every way.

Measurements

Canada uses the metric system. All astronomy measurements in this class must be metric. Canada is part of the International Organization for Standardization (ISO). So dates must comply with the ISO8601 format: YYYY-MM-DD, for example: 2015-01-08. Time must be given in 24-hour format, with leading zeroes as needed to fill in digits, for example: 08:00 is in the morning, 20:00 is in the evening. Dates and measurements must be reported in the correct format, or marks will be deducted.

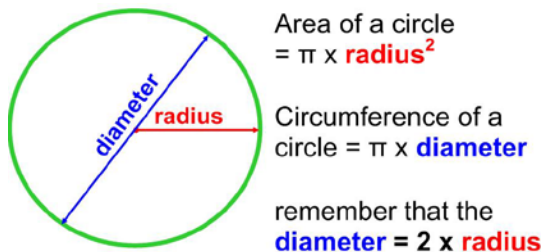
Speed of Light

The symbol is lowercase **c**. **Memorize** the value: $c = 3.00 \times 10^8 \text{ m/s}$

Circles

The traditional facts about a circle are:

- the definition of its **radius** (symbol: **r**),
- the definition of its **diameter** (symbol: **d**),
- the definition of its **circumference** (symbol: uppercase **C**),
- the value of π ,
- the formula $C=2\pi r$
- and the formula for its area, $A=\pi r^2$



Sphere

A sphere shares with a circle the definitions of radius, diameter and circumference. As well, you need to know that the **volume** of a sphere is

$$V=(4/3)\pi r^3$$

Metric Units

Primarily, metric units will be used in this course. The prefixes commonly used in astronomy are

- **Mega (M)** $=10^6$
- **Kilo (k)** $=10^3$
- **Milli (m)** $=10^{-3}$
- **Micro (μ)** $=10^{-6}$
- **Nano (n)** $=10^{-9}$

In addition to the common non-standard units for time (minutes, hours, days and years), astronomy uses the following non-standard units for length:

- **astronomical unit (AU)** = 150 million kilometres = 1.5×10^{11} metres
- **light-year (ly)** = 9.5 trillion kilometres = 9.5×10^{15} metres
- **parsec (pc)** = 31 trillion kilometres = 3.1×10^{16} metres

Each of these has a very precise definition.