

ASTR 1010 Exam Review Session

February 10, 2020

1 Fundamentals

1.1 Basic Definitions

Star -

Planet -

Satellite (or Moon) -

Asteroid -

Comet -

Solar System -

Galaxy -

Universe -

1.2 Math

1.2.1 Powers of Ten

- Prefixes you should know:

Unit Prefix	Prefix Symbol	Power of 10
Milli-	m	10^{-3}
Centi-	c	10^{-2}
Kilo-	k	10^3
Mega-	M	10^6
Giga-	G	10^9
Tera-	T	10^{12}

- Scientific Notation

- Basic concept: writing numbers that are too large or too small using powers of 10.
- Multiplying and dividing numbers represented in scientific notation.

* Multiplying:

$$(a \times 10^n) \times (b \times 10^m) = \underline{\hspace{2cm}}$$

* Dividing:

$$\frac{a \times 10^n}{b \times 10^m} = \underline{\hspace{2cm}}$$

1.2.2 Units and Conversions

- Units of length you should know:
 - miles
 - kilometers
 - astronomical units (AU)
 - light-years
- A key equation:

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Lookback Time -

1.3 How to talk about our sky

Celestial Sphere -

North Celestial Pole (NCP) -

South Celestial Pole (SCP) -

Celestial Equator -

Ecliptic -

Zenith -

Horizon -

Meridian -

Altitude -

Angular Size -

$$\text{Latitude} = \text{Altitude of NCP (polaris)}$$

2 Motions

2.1 Daily Motions

Circumpolar -

Latitude -

Longitude -

Apparent: everything makes circles around the NCP (polaris); rises in the East, crosses the meridian, then sets in the West.

Actual: the Earth is rotating!

2.2 Annual Motions

Analemma -

Summer Solstice -

Winter Solstice -

Equinox -

Retrograde Motion -

Apparent:

- The Sun's altitude changes throughout the year - _____ is the reason for seasons!
- The Sun rises exactly East and sets exactly West on equinoxes, northward closer to the summer solstice, and southward closer to the winter solstice.

Actual: All because the Earth is orbiting around the Sun and its axis is tilted!

What do these mean for us viewing the sky in Boulder?

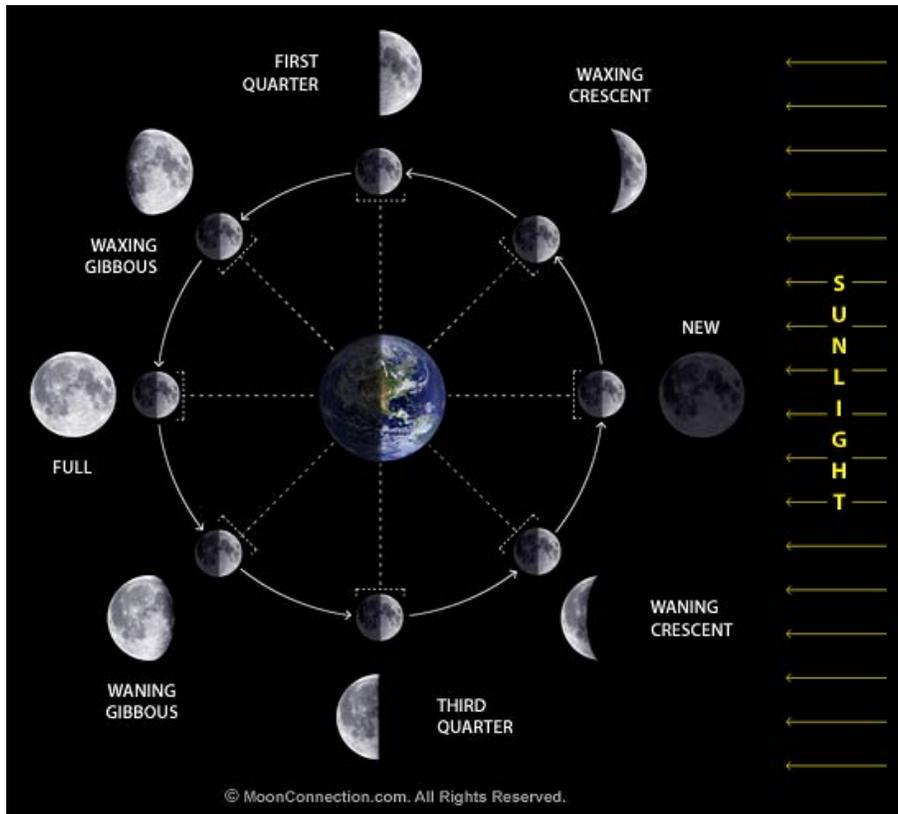
Recap:

- Stars are very far away (they essentially appear to not move).
- Earth rotates.
- Earth orbits the Sun.
- Earth's rotation axis is tilted with respect to the ecliptics.

2.3 Phases of the Moon

Synchronous Rotation -

Given a moon phase and its position in the sky, you should be able to figure out what time it is!



2.4 Eclipses

Umbra -

Penumbra -

Perigee -

Apogee -

Nodes -

Lunar eclipses happen when _____ and _____. The three types of lunar eclipses are: _____, _____, and _____.

When do the three types of lunar eclipses happen?

Solar eclipses happen when _____ and _____. The three types of solar eclipses are: _____, _____, and _____.

When do the three types of solar eclipses happen?

3 Basic Astronomy History

Geocentrism (geocentric) -

Heliocentrism (heliocentric) -

Ellipse -

Eccentricity -

Foci (focus) -

Semi-major Axis -

Period -

The Greek astronomers (thousands of years ago) believed in two key things: _____ and _____.

Ptolemy came up with the idea of _____.

Copernican Revolutionaries (hundred of years ago) are listed below. Why is each of them important?

Nicolaus Copernicus -

Tycho (and Sophia) Brahe -

Johannes Kepler -

Galileo Galilei -

Kepler's Three Laws of Planetary Motion are:

1. _____
2. _____
3. _____