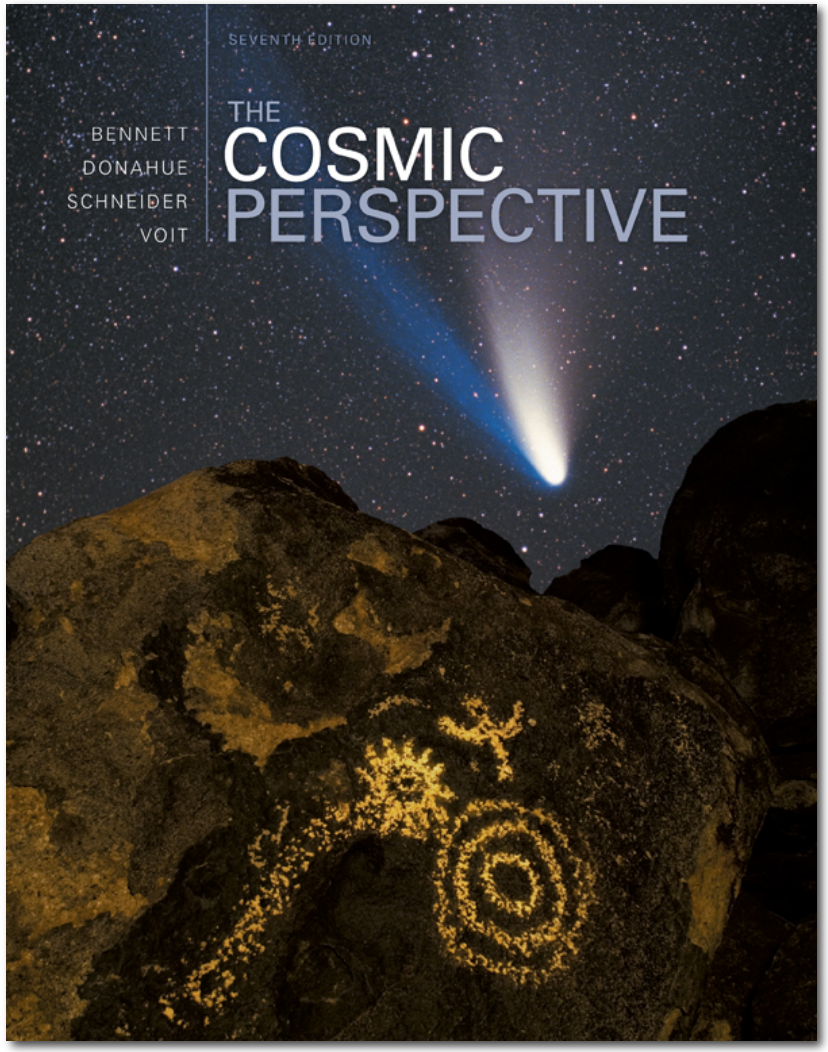
The Cosmic Perspective

Seventh Edition



Celestial Timekeeping and Navigation

S1.1 Astronomical Time Periods

- How do we define the day, month, year, and planetary periods?
- How do we tell the time of day?
- When and why do we have leap years?

How much does Earth rotate during one solar day?

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b) about 359 degrees
c) about 361 degrees
d) about 365 degrees
e) Earth does not rotate.

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b) a synodic month.
c) a solar month.
d) a lunar month.
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The difference between a tropical year and a sidereal year is due to

a) the combination of Earth's rotation and Earth's orbital motion.
b) the mismatch of the exact length of a year and 365 days.
c) the tug of the Moon on Earth as it orbits the Sun.
d) the precession of Earth's rotation axis.

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When is an object at opposition?

a) when the object is on the opposite side of Earth as the Sun
b) when the object is on the opposite side of the Sun as Earth
c) when Earth and the Sun are on opposite sides of the object
d) when the object's motion relative to the stars changes direction and becomes retrograde

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Which of the following statements about mean solar time and apparent solar time is *not* true?

a) Mean solar time is based on the average length of the solar day.
b) Apparent solar time measures noon when the Sun is on the meridian.
c) Mean solar time is sometimes ahead of apparent solar time and sometimes behind apparent solar time.
d) Mean solar time and apparent solar time are always within about 4 minutes of each other.

Which of the following statements about mean solar time and apparent solar time is *not* true?

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Leap years account for

a) the combination Earth's rotation and Earth's orbital motion.
b) the mismatch of the exact length of a year and 365 days.
c) the difference between sidereal years and tropical years.
d) the changing length of the year from one year to the next.

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b) the mismatch of the exact length of a year and 365 days.

c) the difference between sidereal years and tropical years.

d) the changing length of the year from one year to the next.

S1.2 Celestial Coordinates and Motion in the Sky

- How do we locate objects on the celestial sphere?
- How do stars move through the local sky?
- How does the Sun move through the local sky?

How does the position of the Sun on the celestial sphere change over the course of a year?

a) Its right ascension changes and its declination remains constant.
b) Its right ascension remains constant and its declination changes.
c) Its celestial coordinates remain fixed.
d) Both its right ascension and declination change.

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The declination of an object tells us

a) its angular distance above the horizon.
b) its angular distance from the meridian.
c) its angular distance from the prime meridian.
d) its angular distance from the celestial equator.
e) its angular distance from the ecliptic.

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At what altitude does the celestial equator cross your meridian?

a) 90 degrees
b) 90 degrees minus your latitude
c) your latitude
d) 0 degrees
e) The celestial equator does not cross the meridian.

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What is the arctic circle?

a) It is the region of the arctic north of all land masses.
b) It is the path that the Sun makes in the sky over the course of a year when viewed from the north pole.
c) It is the latitude in the northern hemisphere north of which the Sun doesn't set for at least one full day.
d) It is the latitude in the northern hemisphere north of which the Sun doesn't rise for at least one full day.
e) C and D

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e) C and D

When is the Sun highest in the sky at noon for someone who lives on the equator?

a) on the equinoxes (March 21 and September 21)
b) on the solstices (June 21 and December 21)
c) on the winter solstice (December 21)
d) It is the same altitude at noon on all days.
e) when the Moon is in the 7th house and Jupiter aligns with Mars.

When is the Sun highest in the sky at noon for someone who lives on the equator?

a) on the equinoxes (March 21 and September 21)

b) on the solstices (June 21 and December 21)

c) on the winter solstice (December 21)

d) It is the same altitude at noon on all days.

e) when the Moon is in the 7th house and Jupiter aligns with Mars.

During which period of time is the Sun continuously below the horizon for someone at the south pole?

a) from March 21 to September 21
b) from June 21 to December 21
c) from September 21 to March 21
d) from December 21 to June 21

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Stars cross the meridian

a) at an altitude equal to their declination.
b) at an altitude equal to their declination plus your latitude.
c) at an altitude equal to their declination minus your latitude.
d) none of the above

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The altitude of the North Celestial Pole in your local sky

a) is equal to your latitude.
b) is equal to 90 degrees minus your latitude.
c) is equal to 90 degrees.
d) depends on the time of day.
e) depends on the season.

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a) is equal to your latitude.

b) is equal to 90 degrees minus your latitude.

c) is equal to 90 degrees.

d) depends on the time of day.

e) depends on the season.

S1.3 Principles of Celestial Navigation

- How can you determine your latitude?
- How can you determine your longitude?

To measure latitude, one needs a way to measure

a) angles in the sky.
b) time very accurately.
c) A and B.

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To measure longitude, one needs

a) to measure angles in the sky.
b) to have a very accurate clock.
c) to have a way to communicate instantly with someone at a different, known longitude.
d) all of the above.
e) B or C.

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a) to measure angles in the sky.
b) to have a very accurate clock.
c) to have a way to communicate instantly with someone at a different, known longitude.
d) all of the above.
e) B or C.

If a star crosses the meridian as seen from Greenwich, England, at midnight, when does it cross the meridian for someone at a longitude of 90 degrees West?

a) midnight
b) 6 a.m.
c) 6 p.m.
d) 9 a.m.
e) 9 p.m.

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