

1. a. Capella, Auriga
b. Sirius, Canis Major
c. Thuban, Draco
2. a. 22h 57m, $-29^{\circ} 37'$
b. 10h 08m, $11^{\circ} 58'$
c. 16h 29m, $-26^{\circ} 26'$
d. 3h 08m, $40^{\circ} 58'$
3. a. Orion, Eridanus,
Taurus, Cetus, Pisces,
Aquarius, Aquila,
Serpens, Ophiuchus,
Virgo, Leo, Sextans,
Hydra, Canis Minor,
Monoceros
b. Quito, Belem, Nairobi
4. a. Vega
b. Fomalhaut
5. a. E to W due to Earth's
rotation
b. E to W due to Earth's
orbit or revolution
6. a. 15.04°
b. E to W
c. 10:56 pm
7. a. Dec. 23
b. Apr. 28
c. Mar. 9
d. Jul. 20

8.
 - a. Cygnus, Deneb
 - b. Capricornus
 - c. Perseus
 - d. Fomalhaut, Sculptor, Piscis Austrinus
9.
 - a. E to W due to Earth's rotation
 - b. W to E due to Earth's orbit or revolution
10.
 - a. graph
 - b. ecliptic
 - c. autumnal equinox = 9/22
winter solstice = 12/21
 - d. sun moves southward and lower in the observer's sky because northern hemisphere tilts away from Sun
11. 2.46'
12. 23 hrs 52 min.
13.
 - a. 5:00 am
 - b. 6:36 am
 - c. 7:00 pm
 - d. 8:36 pm
14. 8h 40m, 18°

15.
 - a. It would be same as celes. equator
 - b. Perhaps due to varying dist. from Sun, but much less intense
 - c. Tropics would be undefined
 - d. Sun would appear every day same as it does now only on the equinoxes
16.
 - a. 72 yrs.
 - b. Sagittarius
 - c. Virgo
 - d. 44°
17.
 - a. E to W
 - b. W to E
18.
 - a. Jan. 30, 12 noon
 - b. Jan. 15, 6 pm
 - c. Jan. 23, 3 am
 - d. Jan. 8, 9 am
19.
 - a. waxing crescent
 - b. W, near horizon
 - c. 1st quarter, S

20. a. graph
b. orbit of moon is tilted relative to Earth's orbit
c. 5° , which is tilt of Moon's orbit
d. Essentially yes the path is repeated
 But it is not exactly the same
21. $33'$
22. 7.14 days
23. a. April 08, 2024
b. total eclipse? nearly same position in sky and
 apparent size of Moon vs. Sun ($33.7'$ vs $31.9'$)
c. at next new moon 5/08 Sun and Moon
 are not at same coordinates
d. dates of full Moons 3/25 or 4/23
24. a. twice per year d. every sunset and sunrise
 b. twice per year e. once in a lifetime
 c. every night f. once every few years

Chart 1 of 2 for HW Problems 10 and 20

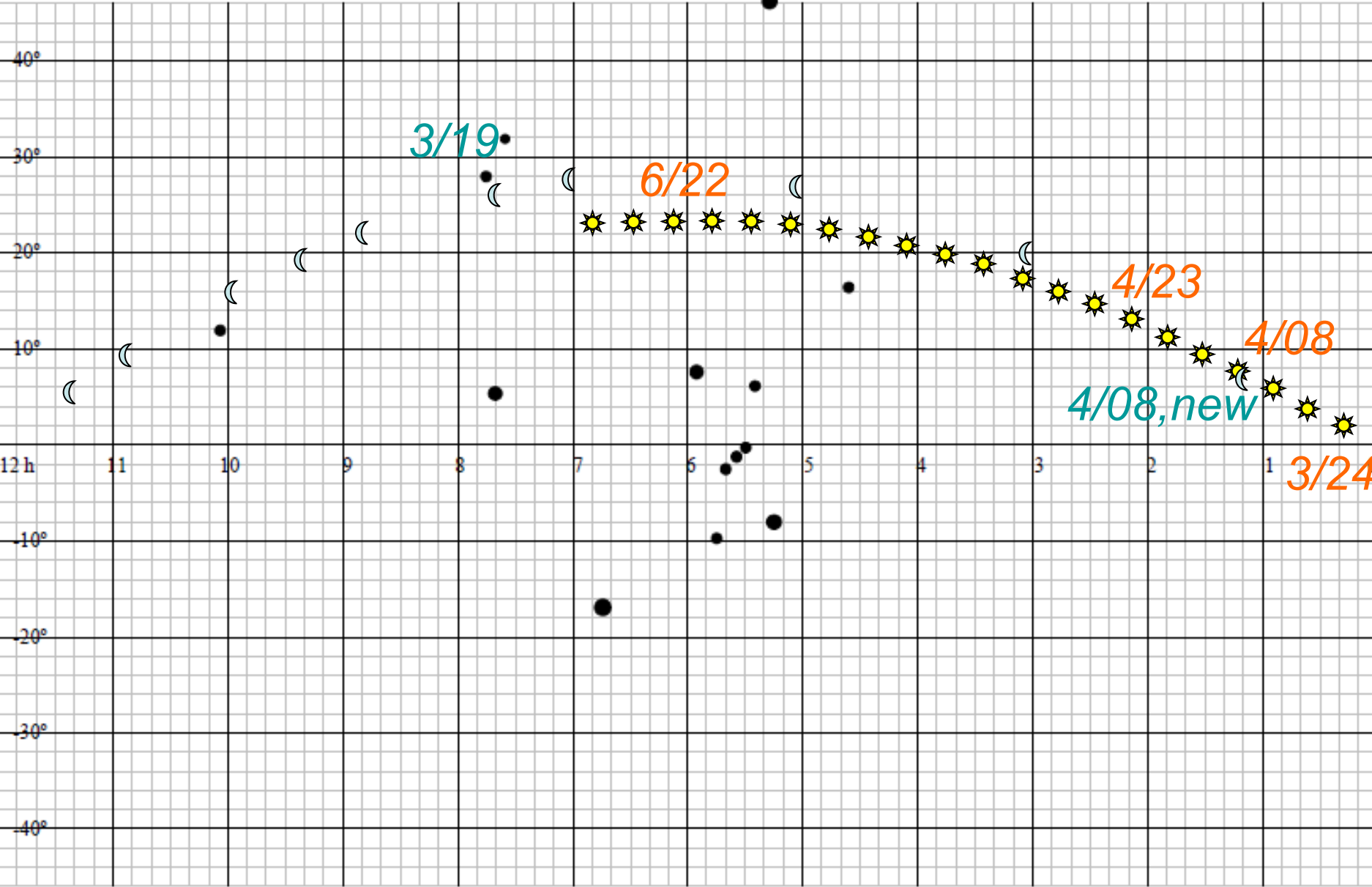
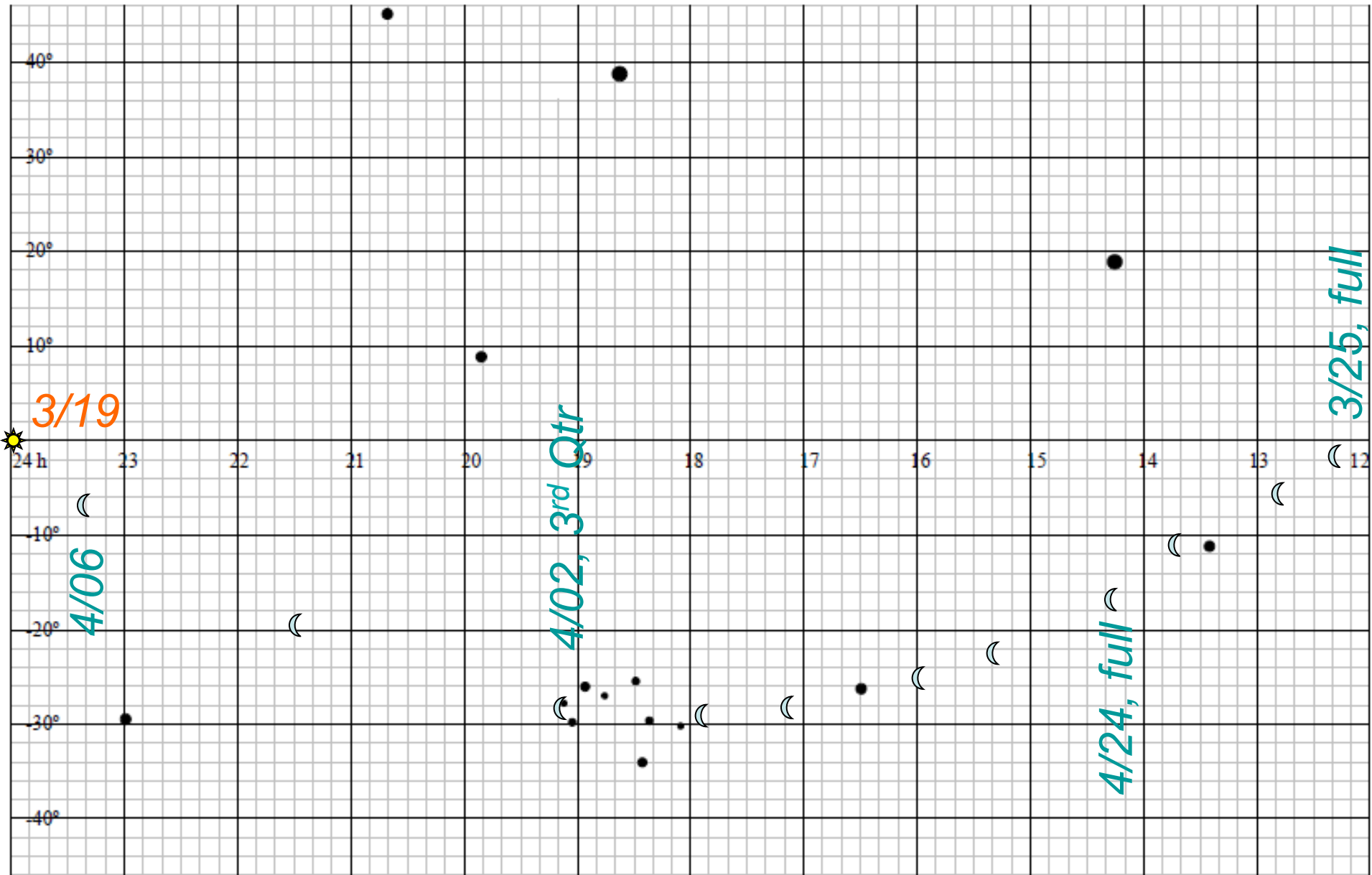
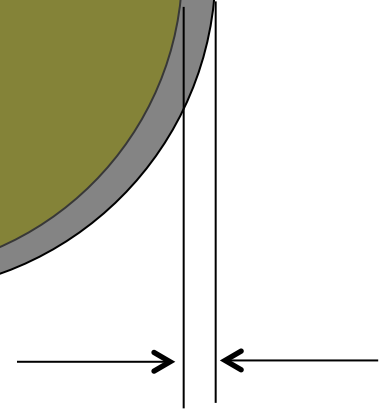
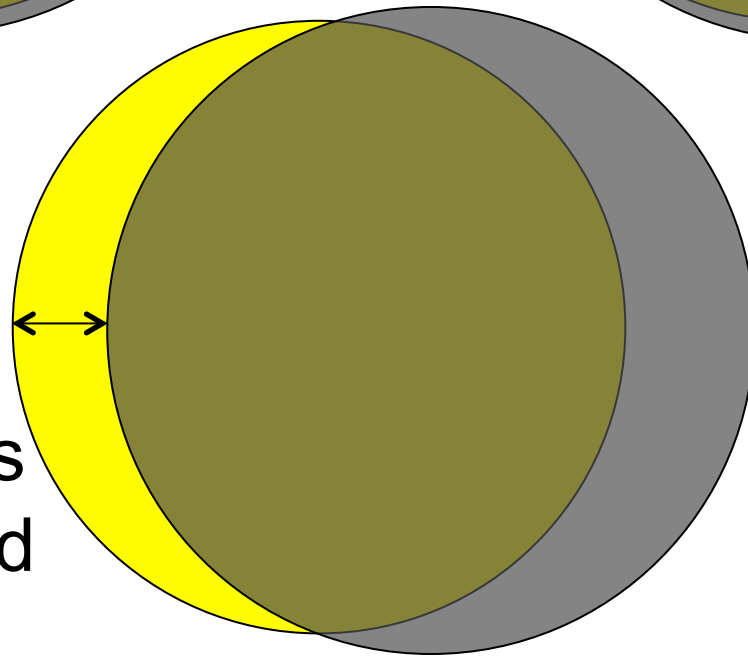
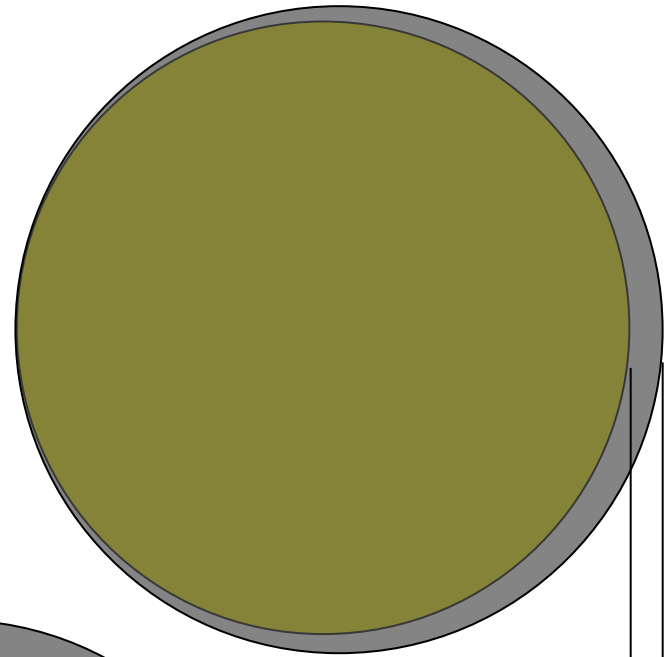
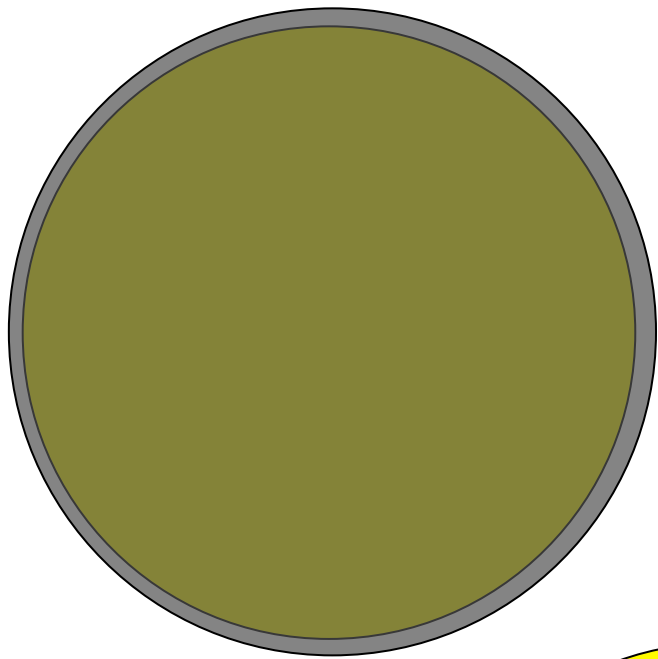


Chart 2 of 2 for HW Problems 10 and 20



Date	Time	RA	Decl.	Az.	Alt.	Dia.
03/24	3 pm	00 ^h 16 ^m	+01° 50'	212.4°	51.4°	32.1'
04/08	3 pm	01 ^h 11 ^m	+07° 36'	218.7°	55.9°	31.9'
04/23	3 pm	02 ^h 07 ^m	+12° 53'	225.5°	59.9°	31.8'
05/08	3 pm	03 ^h 04 ^m	+17° 22'	232.1°	63.1°	31.7'
03/25	3 am	12 ^h 19 ^m	-01° 41'	210.0°	48.2°	29.8'
04/08	3 pm	01 ^h 11 ^m	+07° 37'	218.8°	55.9°	33.7'
04/10	3 pm	03 ^h 04 ^m	+20° 06'	161.6°	73.4°	33.1'
04/24	3 am	14 ^h 18 ^m	-16° 46'	202.4°	34.2°	30.2'

23. (a) Determine the date on which a solar eclipse occurs. (b) Based on the information given what *type* of solar eclipse would an observer in Knoxville witness on that date? (c) A new moon after the one shown in the table occurs on May 8 and has about the same RA and declination as shown for April 10. This will not be an eclipse – explain. (d) A penumbral lunar eclipse occurs on at least one of the dates in the table – which one(s)? Explain



at 3 pm:
azimuths are
different by 0.1
degree – makes
this gap 5.1' and
eclipse partial!

$33.7' - 31.9' = 1.8'$
centers must be
aligned within 0.9'
for total eclipse