Physics 108 - Cosmology   Homework 1

1. You should know you got the correct result if you
+5   found a well-known landmark at the specified
      coordinates

+5.1 2. a) 24 hrs $\times \frac{60 min}{1 hr} \times \frac{60 sec}{1 min}$ = 86,400 seconds

+5   b) 23 hrs $\times 60 min \times \frac{60 sec}{1 min}$ = 82,800

          + 56 min $\times \frac{60 sec}{1 min}$ + 3,360

                  + 4 sec   + 4

                                    = 86,164 seconds

+5   c) The difference in one day is
          86400 - 86164 = 236 seconds
          Then multiply by 365 days
              236 $\times$ 365 = 86,140 seconds

          Just about 1 Siderial day

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3. 1 hr of RA is $\dfrac{360°/day}{24\ hr/day} = 15°/hr$

4. The celestial north pole is at Declination 90°, while Thuban is only about 64°.
Convert the declination to decimal degrees and take the difference

$\dfrac{33''}{60''} = 0.55$ add to 22' to get 22.55''

$\dfrac{22.55'}{60'} = 0.37583$ degrees, add to 64°.

Thuban's declination is 64.37583°, which is

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$90° - 64.37583° = 25.62417°$

from the celestial north pole.

5. The angle from the meridian is the Right Ascension. So convert first to decimal degrees and then to degrees, minutes and seconds.

$06^h \times 15°/hr = 90°$

$\dfrac{45^m}{60^m/hr} \times 15°/hr = 11.25°$

$\dfrac{9^s}{60^s/min} \times \dfrac{1\ min}{60^m/hr} \times 15°/hr = 0.0325°$

Total is 101.2875°

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5 continued

Then convert 101.⁶ to degrees, minutes, seconds

There are 101° .

Then $0.2875° \times \dfrac{60'}{1°} = 17.25'$ gives 17'

Then $0.25' \times \dfrac{60''}{1'} = 15''$

+5   The result is   101° 17' 15''

6. The moon goes around the Earth, and as it does we see all or only part of it lit up by the Sun. (or none of it when we are behind the moon, relative to the Sun, resulting in a "new" moon.

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