assignment 7: optics ***NAME _____***

PART1: Internet search

1)**sky google: pillars of creation.**

Before make sure the box " sky database/astronomy backyard " is checked including the constellation.
As google zooms to the nebula write down the constellation _____ _____ where the object is.
Also note that the other name is _____ nebula. Click on it. The nebula is _____ cluster of stars.
You see the nebula like it was _____ years ago. The photo was taken in 1995 by _____ telescope and it is one of its most famous one. It made the opening of what movie ? (with Judy Foster).
Write down its location. RA = _____and DEC = _____
wikipedia the constellation and draw it below :

Now make sure the box " backyard astronomy and constellation" are checked. Zoom out. What is the zodiac constellation located just below the constellation mentioned above ?

2)go to http://www.aaa.org/home
click on the sky of the month. (Mars). scroll down to see the sky and click on the sky.
Write down the time _____ PM and the date _____/ CLICK TO ZOOM twice.
Can you see any planet ? Moon ? (in green). In which constellations ?

The constellations are in blue and the stars in yellow. Look in the center of the disk. List the zodiac constellations from east to west :

_____

In the constellation Auriga (zodiac). What is the bright star that is visible ? _____
In the constellation

Notes: light gathering power is proportional to the area of a lens. More light means you can see dimmer objects.

Resolution (size of an object you can see. Smaller is better) is inversely proportional to the diameter of the objective) but proportional to the wavelength you are gathering. (for example radio wavelength is large so you have to compensate with the diameter of the lens).
LEARN TO USE GOOGLE if you dislike Sci not. – I am going to help you.
2.
p. 93 problem 1 - show work for full credits
hint; find the wavelength in mm. My advice :USE GOOGLE:
Example if you try to convert 500 nm to mm google : *500 nm to mm*. Then divide the wavelength by 0.001/
To find the wavelength of red, use google *wavelength of red is nm*

3.

p.93 problem 2 - show work for full credits

hint: 100 million =100,000,000. that's the frequency (cycles per second or hertz)
Then use the formula: wavelength = c / frequency c is the speed of light = 300,000,000 m/s /
wavelength is in meter.

4.

p.93 problem 3 - show work for full credits

hint: The light gathering power depends on the area of a telescope. The area is proportional to the radius squared. So to compare the light gathering power of telescope find the ratio of their diameters squared . Use the same units for both diameters. So google *diameter of the keck telescopes in meters* (or check slides). Divide by 0.5 m and square the ratio.

5. p.93 problem 5 - show work for full credits

hint: The resolving power gives you the minimum distance (in arcseconds) between 2 stars the telescope can resolve. For example, our eyes can't resolve 2 objects if the distance between them (as seen by us) is smaller than 1/60 degree or 1 arcminute. The resolution depends on the diameter of the telescope and on the wavelength of the light.
Resolution = (252,000 x wavelength) / diameter diameter in meters, wavelength in meters, R in arcseconds or seconds of arc . Suppose you are observing in the visible light and the wavelength = 6 10^{-7} meters (in yellow). Diameter=0.25m.
Now compute R = (252,000 x 6E-7) / 0.25
Then compare R to 1.5. If 1.5 < R, you can't tell the stars apart. Other wise, they are distinct.

7. p.93 problem 6 - show work for full credits

hint: R = (250,000 x wavelength) / diameter . Same as before but now diameter = 0.02m.

8.What is the angular resolution of a Binoculars? (d = 3cm = 0.03m convert to meters)

R = (252,000 x 6E-7) / 0.03