

Your name: \_\_\_\_\_

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# Physics: Homework 01

1. The picture on the right is of a reflecting radio telescope at Stanford University. Does it look like you could see your face in it? If not, why might it work as a reflector?



2. If a telescope with focal length 30 cm "sees" an object taking up  $2^\circ$  of its view, how big is the image in the telescope?
3. If an object makes an image that's 0.5 mm on your retina, how many degrees of your view does it occupy?
4. When you zoom into an object optically with your camera (not electronic zoom), does the lens extend or contract? Why?
5. Why is a ground-based x-ray telescope not a great idea?
6. What is the resolution in seconds of telescope with a 0.5 m diameter lens at visible light?
7. Some telescopes are dual-purpose: they detect visible light and infra-red. Were the telescope in the question above capable of this, would it have higher resolution in infra-red or lower (compared to visible light)?
8. What diameter lens do you need on a telescope that can resolve up to a thousandth of a second?
9. A magnifying glass is rated at 3.5 magnification for normal eyes (i.e., mine, not some crazily good ones – Lucie, Remonia: I'm looking at you, or would be if I could only focus my eyes) that are focused on an image at the near point. What is its focal length? What would the focal length be if the magnification referred to a relaxed eye?
10. What optical instrument was used recently to detect gravitational radiation?
11. Only for Ashley: what is the color of gold?