Tutorial for PHYS210 Lecture 9. Telescopes, microscopes

You have available 4 lenses:
A biconvex lens with a focal distance of 50 mm
A biconvex lens with a focal distance of 100 mm
A biconvex lens with a focal distance of 500 mm
A biconcave lens with a focal distance of −100 mm

1) a) Which of the available lenses gives the best magnification when used as a magnifying glass?
   b) At what distance should you hold it from an object to be able to see it without accommodating the eye?
   c) What is the magnification of this lens compared to seeing the object without the lens at a distance of 25 cm?

2) a) Which two lenses would give the largest magnification when used to make an astronomical telescope?
   b) What is the magnification?
   c) What is the distance between the two lenses?

3) a) Which two lenses would you use to make a Galilean telescope?
   b) What is the magnification?
   c) What is the distance between the two lenses?

4) Use the two strongest lenses in the configuration of a compound microscope. Use the strongest lens as eyepiece and the second strongest lens as the objective.
   a) What is the magnification of the eyepiece?
   b) What should the magnification of the objective be to achieve a total magnification of −10?
   c) What should be the distance between the eyepiece and the objective?