Curved Mirror Questions

1. *On a separate sheet of paper, solve for the unknown values / properties in the table*:

Mirror	f (cm)	C (cm)	d_o (cm)	d_i (cm)	M	Real or Virtual	Attitude
Concave	+ 10	+ 20	30			Real	Inverted
	+ 15		30				Inverted
	- 15	- 30		- 10		Virtual	
Convex		- 26	16				
	+ 30		30				

For the following problems, use the GRASS method (Given, Required, Analysis, Substitution, and Solution).

2. A thumb of height 8.0 cm is held in front of a concave mirror of focal length 10.0 cm. The image is formed 12.0 cm from the vertex of the mirror. Find:
   a. The position of the object.
   b. The magnification
   c. The size of the image
   d. The type and orientation of the image

3. In a physics lab, a candle is placed in front of a converging mirror with a focal length of 15 cm. If the candle sits at the centre of curvature (C) and has a flame 1.5 cm tall, find:
   a. The distance to the object
   b. The image position
   c. The magnification
   d. The image size
   e. The type and orientation of the image.

4. A converging shaving/makeup mirror has a focal length of 17 cm. If the person's face is 12 cm from the vertex of the mirror and is 22 cm long, find:
   a. The image position
   b. The magnification
   c. The image size
   d. The type and orientation of the image.

5. For a concave mirror of focal length 20 cm, where must you place the object so that no image can be seen? Prove with a diagram and using the mirror equation.

6. The Palomar Telescope has a focal length of 18 m. If the diameter of the Sun is 1.39 x10^9 m and its distance to the Earth is 1.49 x 10^{11} m, how large is the image of the Sun?

7. Looking at the back of a spoon you can see an image of your face. If the focal length of the spoon is 5.5 cm, and your face is 10.0 cm away and 22 cm long:
   a. What type of mirror is the spoon?
   b. What sign should the focal length have (positive or negative)?
   c. What is the position of the image?
   d. What is the magnification of the image?
   e. What is the size of the image?
   f. What is the orientation of the image?