Mirror Equation Problems

Two Equations ... Two Unknowns

Show your work in an organized fashion for the following problems. Each problem requires the simultaneous use of the Mirror Equation and the Magnification Ratio equation. They will also require that you give attention to the +/- signs associated with the quantities in the equations.

Sign Conventions		
f	+ for concave mirrors	- for convex mirrors
$\mathbf{d_i}$	+ for real images	- for virtual images
$\mathbf{h_i}$	+ for upright images	- for inverted images
For our purposes, $\mathbf{d_o}$ and $\mathbf{h_o}$ are always positive.		

1. A concave mirror has a focal length of 28.0 cm. An upright image that is four times the size of the object is formed when the object is placed at a specific location *inside* the focal point. Determine the object distance.

2. A real image is produced that is six times the size of the object when the object is placed 21 cm from the mirror surface. Determine the focal length of the mirror.

3. A mirror has a focal point that is 16.0 cm from its surface. Where must the object be located to produce a virtual image that is one-half the size of the object?

4. A mirror has a focal point that is 16.0 cm from its surface. Where must the object be located to produce a real image that is three times the size of the object?

5. A mirror has a focal length of -18 cm. A virtual image that is 90% the size of the object is produced. What is the object distance that results in such an image?

6. An inverted image that is one-fifth the size of the object is produced when the object is placed 78.2 cm from a mirror. Determine the focal length of the mirror.