A. The image formed by a convex mirror (R = 70.0 cm) is located 6.00 cm from the mirror.

1. [6 pts.] What is the image distance?
   \[ \frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o} \]
   \[ d_i = -6.00 \text{ cm} \]

2. [6 pts.] What is the object distance?
   \[ d_0 = \frac{d_i f}{d_i - f} = \frac{(-6\text{ cm})(-35\text{ cm})}{(-6\text{ cm}) - (-35\text{ cm})} \]
   \[ d_0 = 5.74 \text{ cm} \]

3. [6 pts.] If the height of the image is 4.80 cm, what is the height of the object?
   \[ m = -\frac{d_i}{d_0} = -\frac{(-6\text{ cm})}{5.74\text{ cm}} = 0.829 = \frac{h_i}{h_o} \]
   \[ h_o = h_i/0.829 = 5.79 \text{ cm} \]

4. [3 pts.] Characterize the image.
   VIRTUAL, ERECT, REDUCED IN SIZE

B. 1. [14 pts.] You are trying to photograph a bird sitting on a tree branch, but a tall hedge is blocking our view. However, as the drawing shows, a plane mirror reflects light from the bird into your camera. For what distance must you set the focus of the camera lens in order to snap a sharp picture of the bird's image?

   \[ \tan \theta = \frac{0.3 \text{ m}}{2.1 \text{ m}} \]
   \[ (4.3 \text{ m})(3.7 \text{ m}) = 3.7 \text{ m} \]
   \[ d_1 = 2.1 \text{ m} \]
   \[ 6.8 \text{ m} \]
   \[ d_1 = 5.91 \text{ m} \]
   \[ \theta = 2.74 \text{ m} \]

   DISTANCE = \[ \sqrt{\frac{d_i}{d_1} + (3.7 \text{ m})} \]
   \[ d_i + d_2 = 4.6 \text{ m} + 2.6 \text{ m} \]
   \[ = 7.2 \text{ m} \]

2. [4 pts.] On the drawing above locate the image of the bird formed by the plane mirror the camera is photographing. Do this by carefully tracing a pair of rays that show where the image forms.