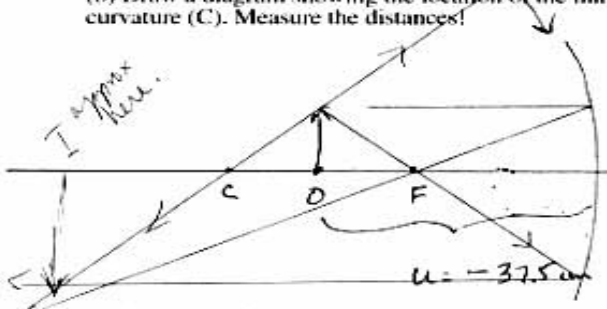
2. A concave spherical mirror has a radius of curvature of 50.0 cm. $R = -50\,cm$

(a) How far from the surface of the mirror is the focus (F) located? $f = \frac{R}{2} = -25\,cm$

(b) Draw a diagram showing the location of the mirror surface, the focus (F) and the center of curvature (C). Measure the distances!



$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{-1}{25} - \frac{1}{-37.5}$$

$$= -.0133\ cm$$

$$v = -75\ cm$$

$$m = -\frac{v}{u} = -\frac{(-75)}{-37.5}$$

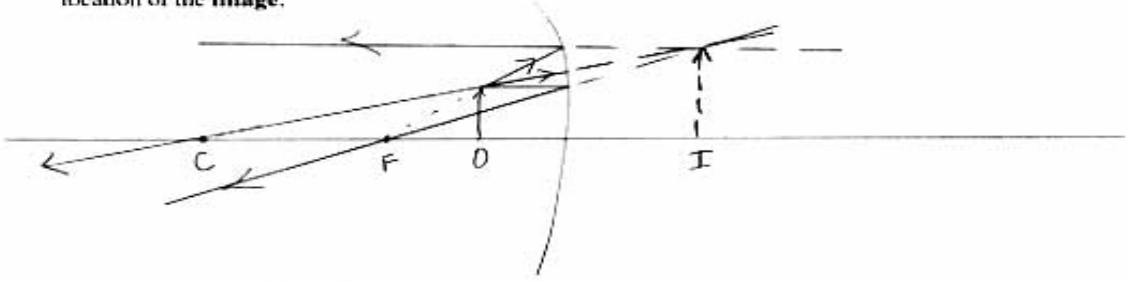
(c) For a real object located halfway between F and C, **draw** a **ray diagram** and find the location of the **image**. Use a straight-edge! $m = -2$

(d) Is the image **erect** / **inverted** ? **larger** / **smaller** than the object? **real** / **virtual** ? (Circle one.)

(e) Now use the mirror equation(s) to calculate the answers to part (d): the location of the image (which tells distance and whether real or virtual) and its magnification (which tells larger/smaller and erect/inverted) and verify that they are consistent.

(f) Repeat parts (c), (d), and (e) for a real object located halfway between F and the surface of the mirror.

(c2) For a real object located halfway between F and mirror, **draw** a **ray diagram** and find the location of the **image**.



(d2) Is the image **erect** / **inverted** ? **larger** / **smaller** than the object? **real** / **virtual** ? (Circle one.)

(e2) Use mirror eqn and calculate ... Agrees with diagram?

$u = -12.5\ cm$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{-1}{25} + \frac{1}{12.5} = \frac{1}{25}$$

$$v = +25\ cm$$

$$m = \frac{-v}{u} = \frac{-25}{-12.5} = +2$$

continues over