

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

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

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

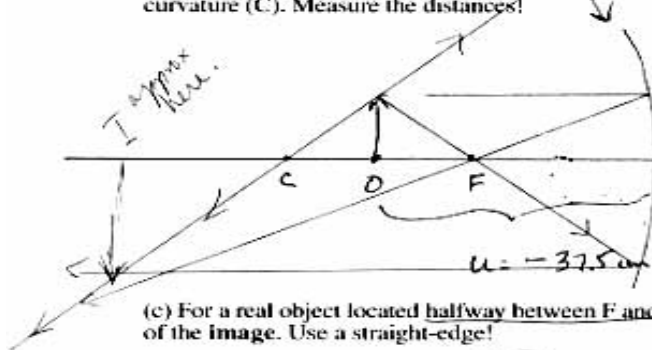
$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

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

$$= -0.0133 \text{ cm}$$

$$v = -75 \text{ cm}$$

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



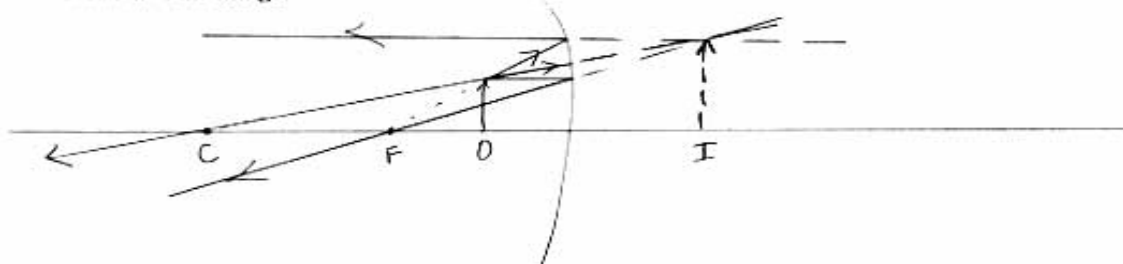
(c) For a real object located halfway between F and C, draw a ray diagram and find the location of the image. Use a straight-edge!

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

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

$$u = -12.5 \text{ cm}$$

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

$$v = +25 \text{ cm}$$

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

continues over

1/16/06