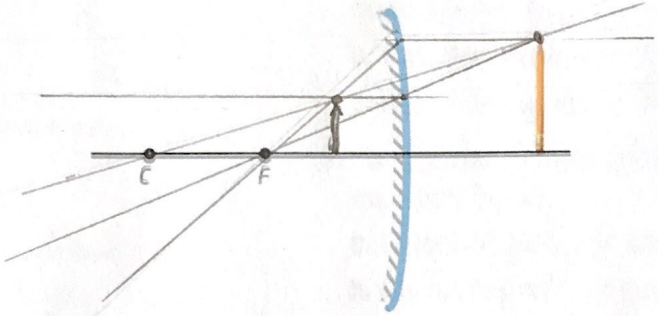
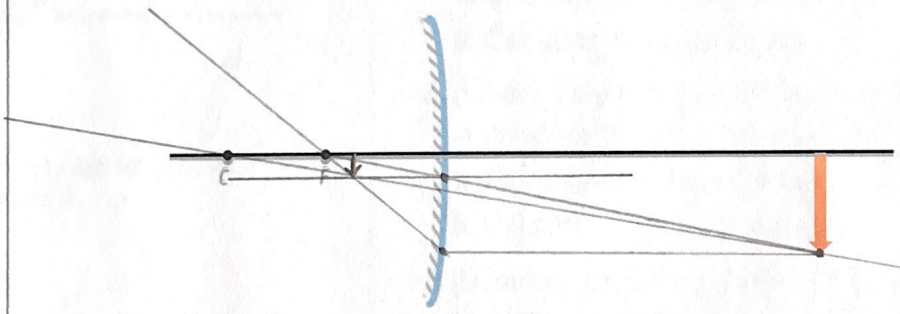
SNC2D Task – Convex Mirrors Name: Soln

1. Draw the images for the following concave mirror setups. Fill in the L.O.S.T. information in the right column. Use a ruler for drawing all rays.

Convex Mirror Setups	Location, Orientation, Size, Type
	L. behind mirror O. upright S. smaller T virtual
	L- behind mirror O. upright (same as image) S. smaller T- virtual

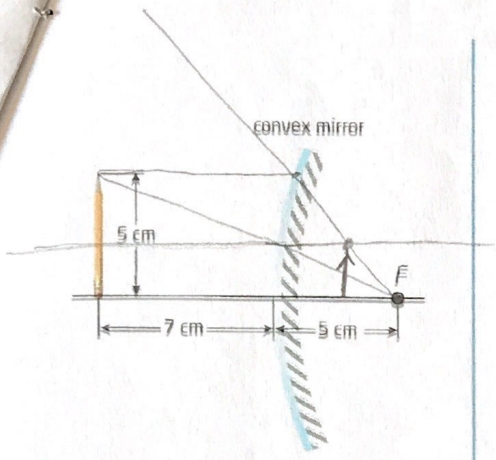
2. What are three benefits of using a Solar cooker (textbook 429, internet "benefits of solar cooker).

(a) No burning of fuel - No fuel req'd, No emissions

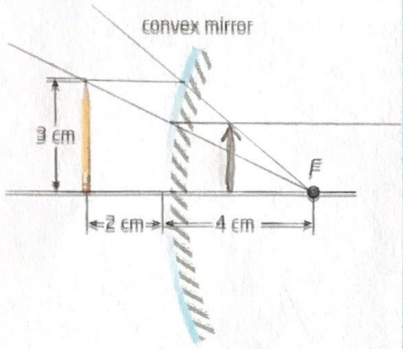
(b) cheap - can be made from easily found materials

(c) portable -

(d) can boil water - sterilization



Use this diagram to solve problem 2.



Use this diagram to solve problem 3.

Practice Problems

1. A convex mirror has a focal length of −0.90 m. An object with a height of 0.40 m is 2.5 m from the mirror.
   a. Calculate the image distance.
   b. Calculate the image height.
2. Use the data in the diagram on the left to answer the questions below.
   a. Calculate the image distance.
   b. Calculate the image height of the image.
3. Use the data in the diagram on the left to answer the questions below.
   a. Calculate the image distance.
   b. Calculate the image height.
4. A convex security mirror in a warehouse has a focal length of −0.50 m. A forklift, which is 2.2 m tall, is 6.0 m from the mirror.
   a. Calculate the image distance.
   b. Calculate the image height.
5. A convex security mirror has a focal length of −0.25 m. A person with a height of 1.5 m is 4.0 m from the mirror.
   a. Calculate the image distance.
   b. Calculate the image height.
6. An object 0.4 m tall is placed 2.5 m in front of a convex mirror that has a focal length of −90 cm.
   a. Calculate the image distance.
   b. Calculate the image height.

$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$ | $\frac{h_i}{h_o} = \frac{-d_i}{d_o}$

#1 $\frac{1}{-0.9} = \frac{1}{d_i} + \frac{1}{2.5}$

$\frac{1}{-0.9} - \frac{1}{2.5} = \frac{1}{d_i}$

$d_i = -0.66\text{ m}$

$\frac{h_i}{0.4} = \frac{-(-0.66)}{2.5}$

$h_i = 0.106\text{ m}$

#2 $\frac{1}{-5} = \frac{1}{d_i} + \frac{1}{7}$

$-\frac{1}{5} - \frac{1}{7} = \frac{1}{d_i}$

$-2.9\text{ cm} = d_i$ (behind mirror)

$\frac{h_i}{5} = \frac{-(-2.9)}{7}$

$h_i = 2.1\text{ cm}$ (upright)

#3 $\frac{1}{-4} = \frac{1}{d_i} + \frac{1}{2}$

$-\frac{1}{4} - \frac{2}{4} = \frac{1}{d_i}$

$-\frac{3}{4} = \frac{1}{d_i}$

$d_i = -\frac{4}{3}$ (−1.33 cm) (behind mirror)

(3) $\frac{h_i}{3} = \frac{-(-\frac{4}{3})}{2}$ (3)

$h_i = \frac{4}{2}$

$h_i = 2\text{ cm}$

#4 $f = -0.5\text{ m}$, $h_o = 2.2\text{ m}$, $d_o = 6\text{ m}$

$\frac{1}{-0.5} = \frac{1}{d_i} + \frac{1}{6}$

$-2 - \frac{1}{6} = \frac{1}{d_i}$

$-2.167 = \frac{1}{d_i}$

$d_i = -0.46\text{ m}$

$\frac{h_i}{2.2} = \frac{-(-0.46)}{6}$

$h_i = 0.17\text{ m}$