

2012 MAR 16

(GG Ch 23 P10)

$$d_o = 1.4m$$

$$m = 3$$

$$\frac{-d_i}{d_o} = m \quad \frac{-d_i}{1.4m} = 3$$

$$d_i = -4.2m$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$\frac{1}{1.4m} + \frac{1}{-4.2m} = \frac{1}{f}$$

$$\frac{3}{4.2m} + \frac{1}{-4.2m} = \frac{1}{f}$$

$$\frac{2}{4.2m} = \frac{1}{f}$$

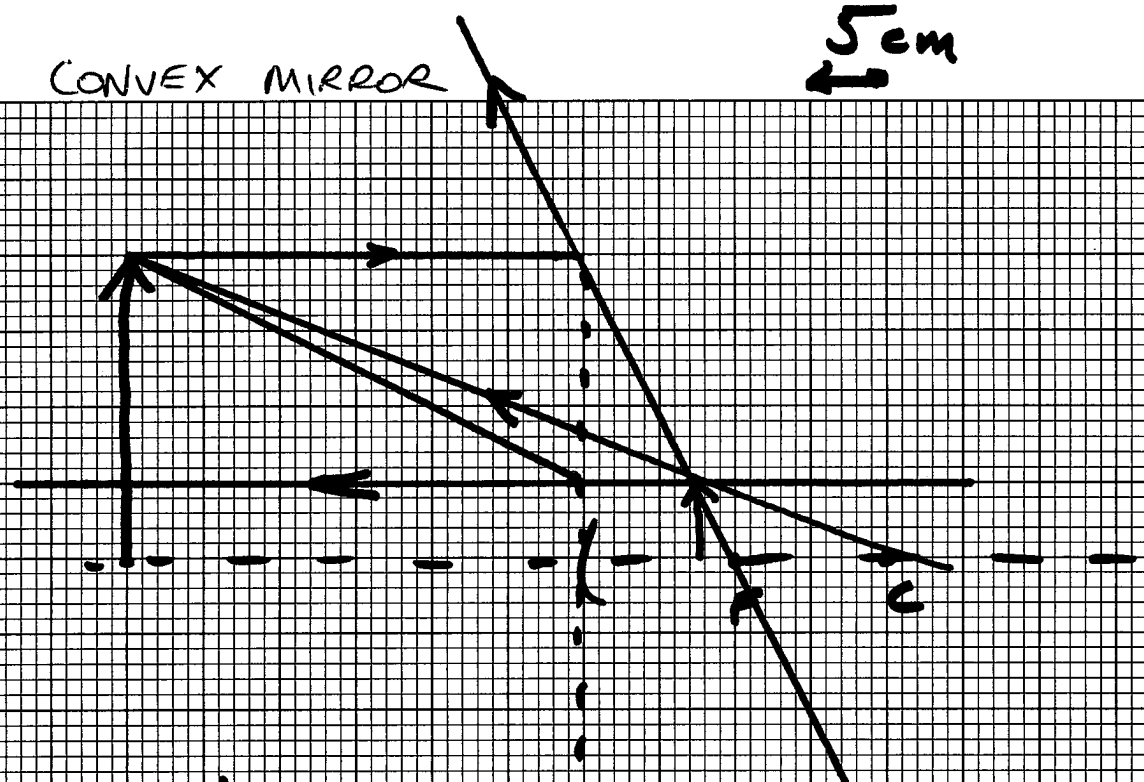
$$f = 2.1m$$

$$f = \frac{r}{2}$$

$$r = 4.2m$$

CONVEX MIRROR

5 cm



$$d_i = -7.5 \text{ cm}$$

UPRIGHT  
VIRTUAL

$$m = -\frac{d_i}{d_o} = -\frac{(-7.5 \text{ cm})}{30 \text{ cm}} = \frac{1}{4}$$

# CONVEX MIRROR EXAMPLE

3 ~~12/11~~

$$d_o = 30 \text{ cm}$$

$$r = 20 \text{ cm}$$

$$f = \frac{r}{2} \text{ BUT } f < 0 \text{ FOR A CONVEX MIRROR,}$$

$$f = -10 \text{ cm}$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$\frac{1}{30 \text{ cm}} + \frac{1}{d_i} = \frac{1}{-10 \text{ cm}}$$

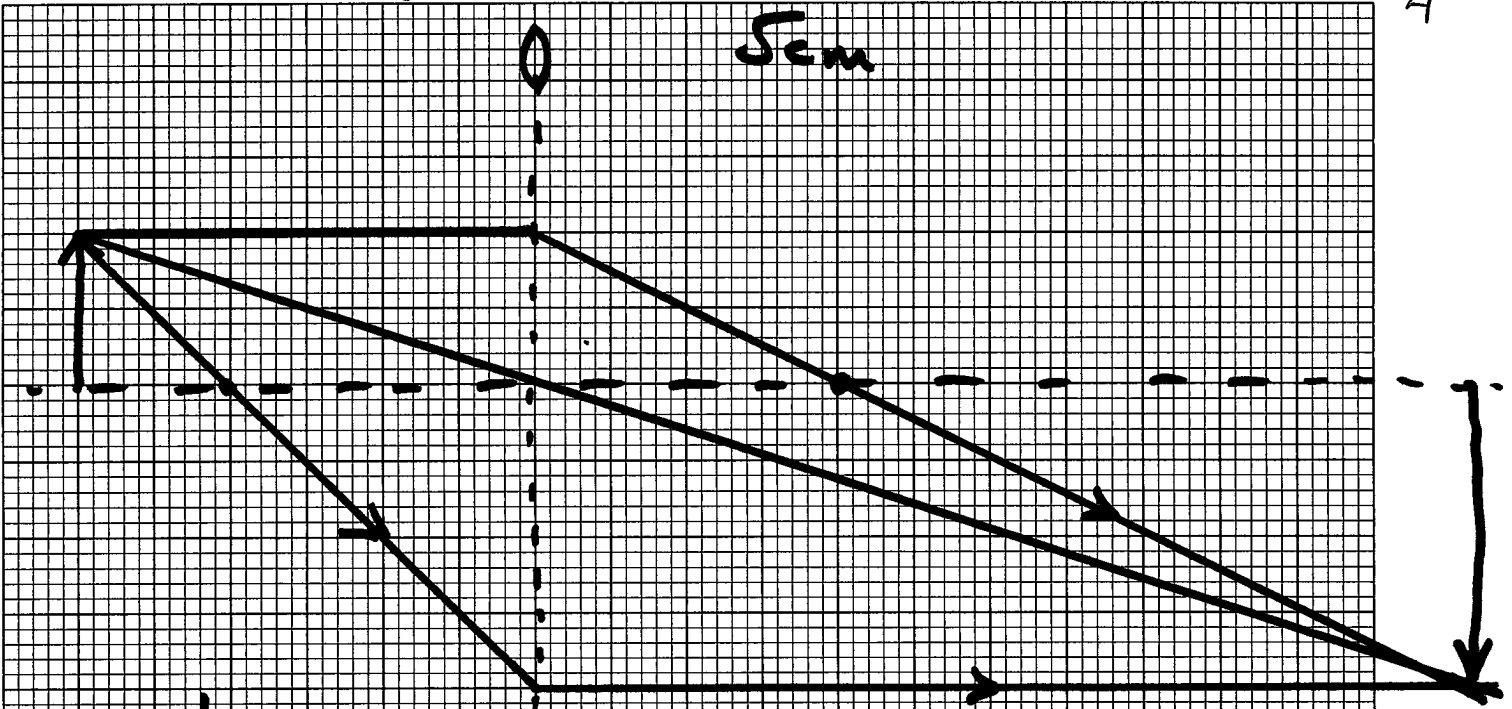
$$\frac{1}{d_i} = -\frac{1}{10 \text{ cm}} - \frac{1}{30 \text{ cm}} = -\frac{4}{30 \text{ cm}}$$

$$d_i = -7.5 \text{ cm}$$

CONVERGING LENS

$f = 30\text{cm}$

4



$$d_i = 60\text{cm}$$

INVERTED  
REAL

$$m = \frac{-d_i}{d_o} = \frac{-60\text{cm}}{30\text{cm}} = -2$$

CONVERGING LENS 1

$$d_o = 30\text{cm}$$

$$f = 20\text{cm}$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$\frac{1}{d_i} = \frac{1}{20\text{cm}} - \frac{1}{30\text{cm}} = \frac{1}{60\text{cm}}$$

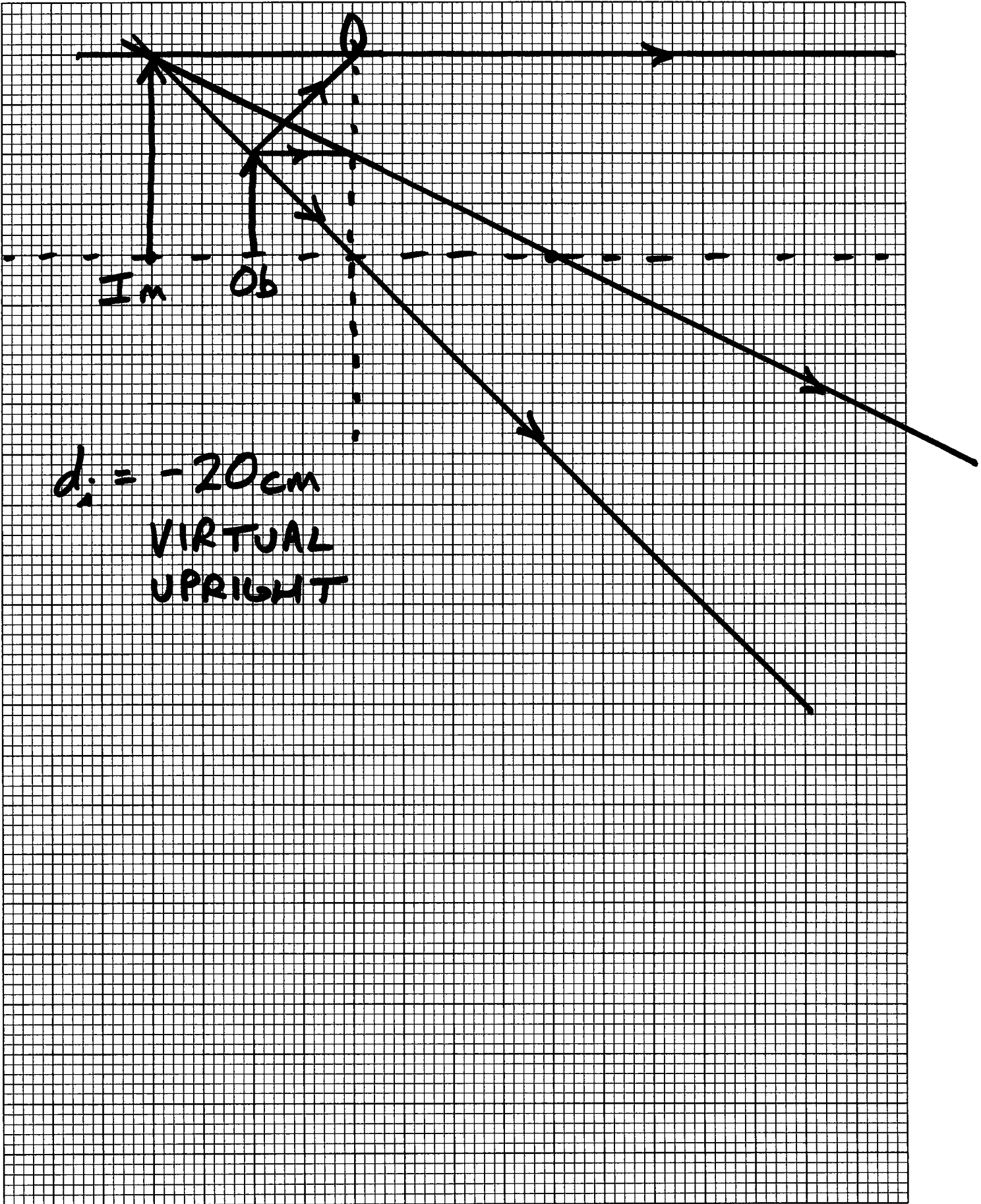
$$d_i = 60\text{cm}$$

REAL (since  $d_i > 0$ )

$$m = \frac{-d_i}{d_o} = \frac{-60\text{cm}}{30\text{cm}} = -2$$

INVERTED (since  $m < 0$ )

CONVERGING LENS 2



$d_i = -20\text{cm}$   
VIRTUAL  
UPRIGHT

## CONVERGING LENS 2

7

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$d_o = 10 \text{ cm}, \quad f = 20 \text{ cm}$$

$$\frac{1}{d_i} = \frac{1}{20 \text{ cm}} - \frac{1}{10 \text{ cm}} = -\frac{1}{20 \text{ cm}}$$

$$d_i = -20 \text{ cm}$$

VIRTUAL (BECAUSE  $d_i < 0$ )

$$m = \frac{-d_i}{d_o} = \frac{-(-20 \text{ cm})}{10 \text{ cm}} = 2$$

UPRIGHT (BECAUSE  $m > 0$ )