## Thin Lens
Practice Quiz

1. A lens has a focal length of 4 cm. The object has a height of 3 cm and is located 8 cm from the lens. Determine the location, height and type of image by:
    (a) ray diagram
    (b) mathematically

2. An object is placed 25 cm from a lens. An inverted, real image is seen 20 cm from the lens. What is the focal length of the lens? What type of lens is it?

3. A diverging lens has a focal length of 12 cm. An upright, virtual image was located 6 cm from the lens. Where was the object located?

①

(a)
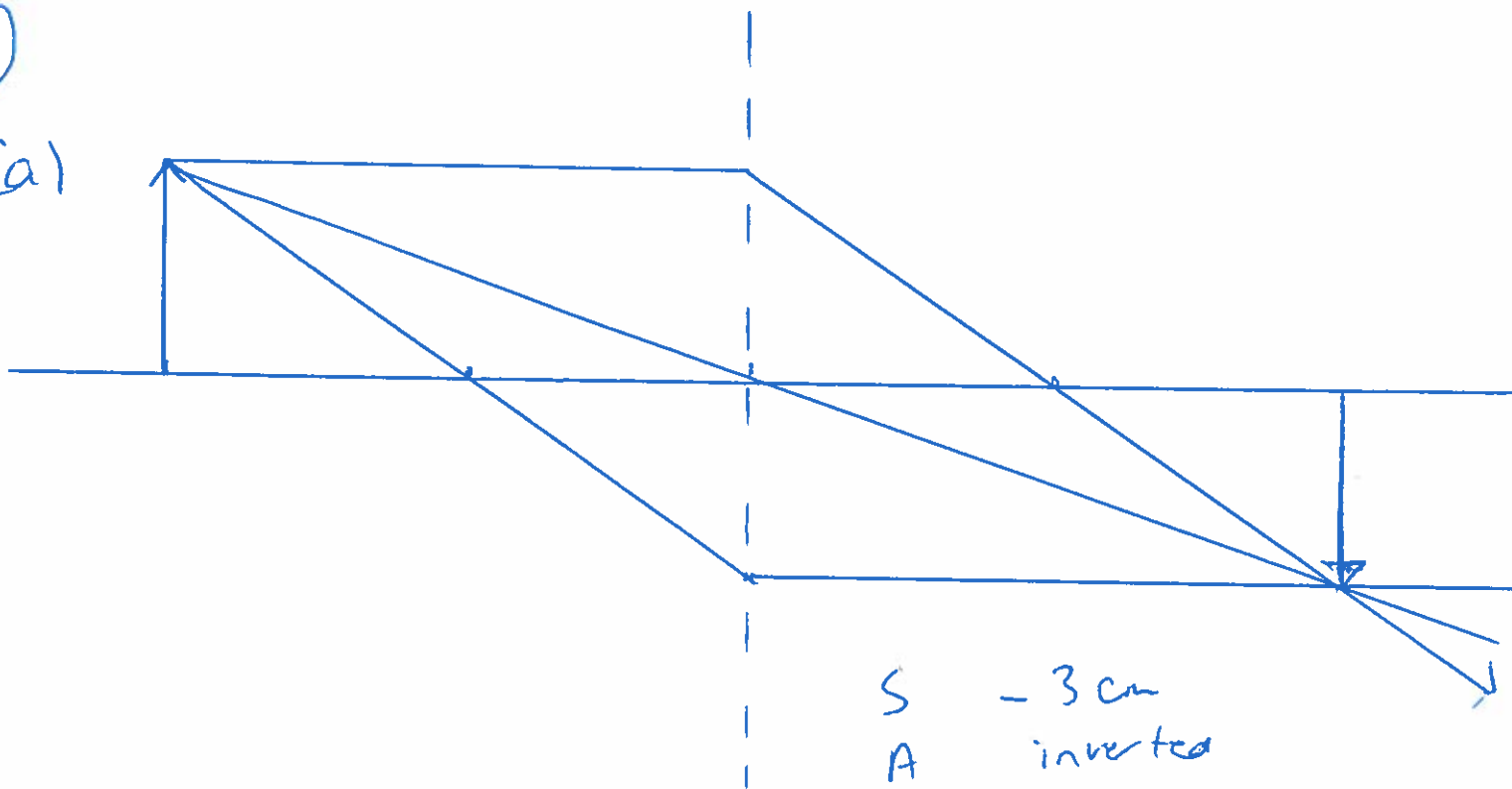
S − 3 cm
A inverted
L 8 cm
T − real

(b)

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

$$\frac{1}{4} = \frac{1}{8} + \frac{1}{d_i}$$

$$\frac{1}{d_i} = \frac{1}{4} - \frac{1}{8}$$

$$\boxed{d_i = 8\,cm}$$

$$\frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$\frac{h_i}{3} = -\frac{8}{8}$$

$$8h_i = (-8)(3) \quad \boxed{h_i = -3}$$

$f = 4\,cm$

$d_o = 8\,cm$

$d_i = ?$

$h_o = 3\,cm$

$d_i = 8\,cm$

$h_i = ?$

(2) $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$

$do = 25$ cm

$di = 20$ cm

$f = ?$

$\frac{1}{f} = \frac{1}{25} + \frac{1}{20}$

$f = 11.1$

∴ the focal length is 11 cm and it is a converging lens

(3) $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$

$f = -12$ cm

$di = -6$ cm

$do = ?$

$\frac{1}{-12} = \frac{1}{d_o} + \frac{1}{-6}$

$\frac{1}{d_o} = \frac{1}{6} - \frac{1}{12}$

$d_o = 12$ cm

∴ the object distance was 12 cm