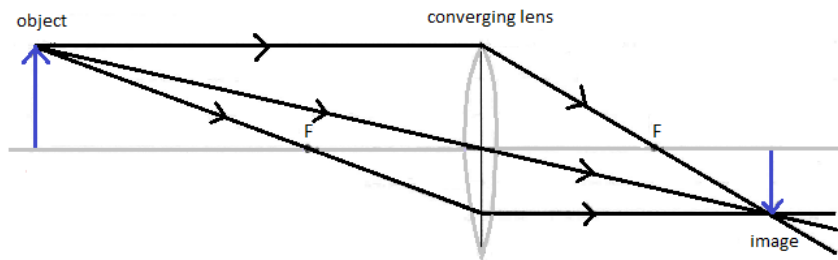


ASTROPHYSICS

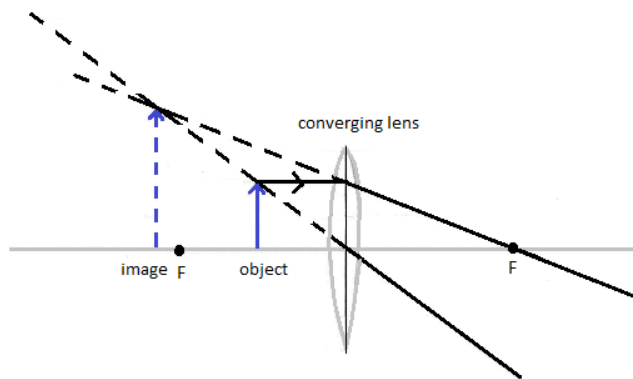
1-1 Lenses

1. (a) Diagram:



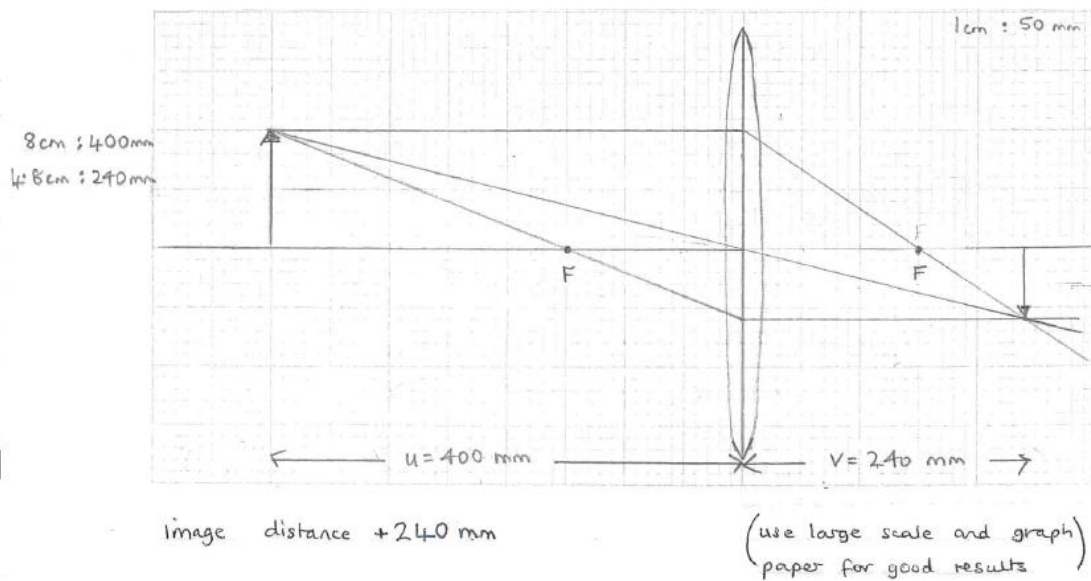
(b) The image is real, diminished and inverted
i.e. can be formed on a screen, is smaller than the object and upside down

2. (a) Diagram:



(b) The image is virtual, magnified and upright
i.e. can't be formed on a screen, larger and in same orientation as the object

3. (a) Diagram:



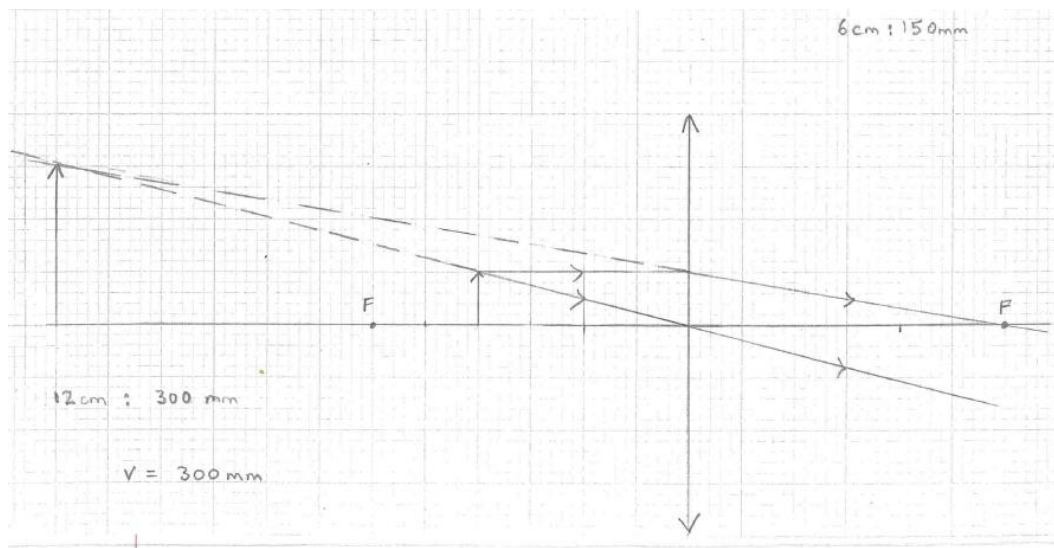
- (b) (i) The image is real
(ii) The image is inverted

[In fact it is possible calculate the answer to check the diagram has been drawn correctly:
 $f = 150 \text{ mm}$, $u = 400 \text{ mm}$

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v} \quad \text{so} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{f} - \frac{1}{u} = \frac{1}{150} - \frac{1}{400}$$

Hence $v = 240 \text{ mm}$
But this is not required]

4. Diagram:



- (b) (i) The image is virtual
(ii) The image is upright

[In fact it is possible to calculate the answer to check the diagram has been drawn correctly:
 $f = 150 \text{ mm}$, $u = 100 \text{ mm}$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{150} - \frac{1}{100}$$

Hence $v = -300 \text{ mm}$
But this is not required]