مدرستنا العليا الخاصة، الورقاء
OUR OWN HIGH SCHOOL, AL WARQA'A

EDUCATION

PHYSICS – LIGHT REFLECTION AND REFRACTION

Name: **Grade: 10 Sec:** **Date:**

SPHERICAL MIRRORS

FORMULAS:

1. Mirror Formula: $1/f = 1/v + 1/u$

* Where f, v and u are the focal length, image distance and object distance.

*This formula is valid for concave and convex mirror in all situations for various positions of the object

2. Magnification (m): $m = \frac{\text{Size of image}(h_i)}{\text{Size of object}(h_o)} = \frac{h_i}{h_o} = \frac{-v}{u}$

* Magnification, m is –ve for real and inverted images and +ve for virtual and erect images.

* Magnification is always +ve for a convex, while it depends on position of object in concave mirror.

* (i) m<1, image is diminished
(ii) m>1, image is enlarged
(iii) m=1, image is of same size as that of the object.

SIGN CONVENTION FOR SPHERICAL MIRRORS

Concave			Convex
Real image (u > or = f)		Virtual image (u < f)	
Distance of Object	u = —ve	u = —ve	u =—ve
Distance of Image	v = —ve	v = +ve	v = +ve
Focal Length	f = —ve	f = —ve	f = +ve
Height of Object	h_o = + ve	h_o = + ve	h_o = +ve
Height of Image	h_i = — ve	h_i = + ve	h_i = +ve
Radius of Curvature	R = _ve	R = — ve	R = +ve
Magnification	m = — ve	m = + ve	m = +ve

::NUMERICALS::

Q.1. Find the size, nature and position of image formed when an object of size 1cm is placed at a distance of 54cm from a concave mirror of focal length 36cm.

Q.2. An object of size 7cm is placed at 27cm in front of a concave mirror of focal length 18cm. At what distance from the mirror should a screen be placed, so that a sharp focused image can be obtained? Find the size and nature of the image.

Q.3. A student wants to project the image of a candle flame on a screen 60cm in front of a mirror by keeping the frame at a distance of 15cm from its pole.
(a) Write the type of mirror he should use?
(b) Find the linear magnification of the image produced.
(c) What is the distance between the object and its image?

Q.4. A convex mirror used for rear view on an automobile has a radius of curvature of 3m. If a bus is located 5m find the position, nature and size of the image.

Q.5. A candle is placed 12cm in front of a convex mirror. When the convex mirror is replaced with a plane mirror the image moves 8.5cm further away from the mirror. Find the focal length of convex mirror.