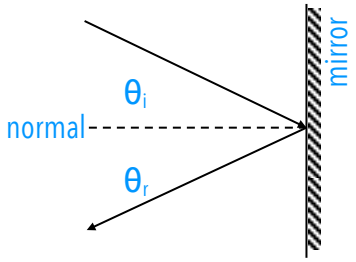
Name_____Pd_____

It Can't Get Much Planar Than This

I. Law of Reflection:

Using the picture below, label the following: Angle of incidence (θ_i), angle of reflection (θ_r), normal line, mirror



What is the law of reflection?_____$\theta_i = \theta_r$_____What mirrors does it work for?_____All_____

Can you think of two other situations (not involving light or mirrors) for which the law of reflection works? [This is not a yes/no question!]

Billiard balls bouncing off of the bumpers, racquetball hitting a wall, ideal gases exerting pressure on their containers, basketball hitting the backboard, a freshman you accidentally pushed bouncing off of their locker in the hallway, a trashcan being hit by a car, an echo from a canyon wall, sonar off of a fish or submarine, electrons bouncing off a substance in an electron microscope

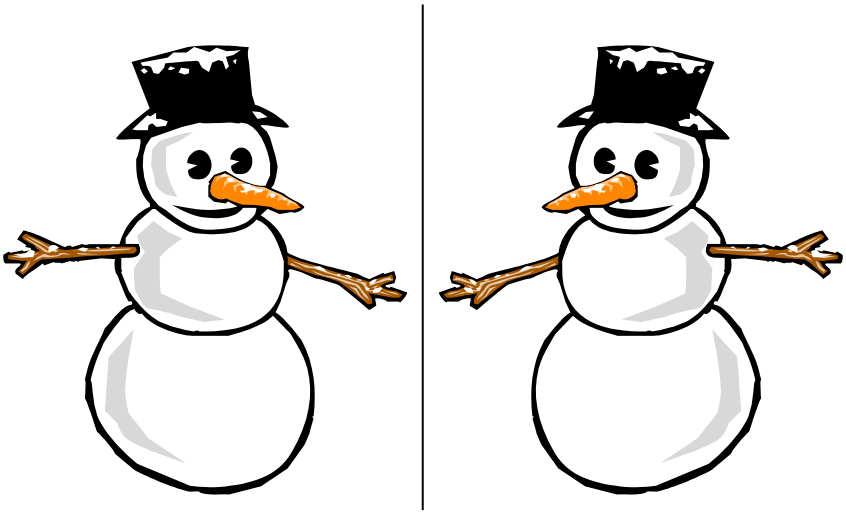
II. Images formed by Plane Mirrors

Images are formed by either incident rays or reflected rays. Which ones? _____reflected_____

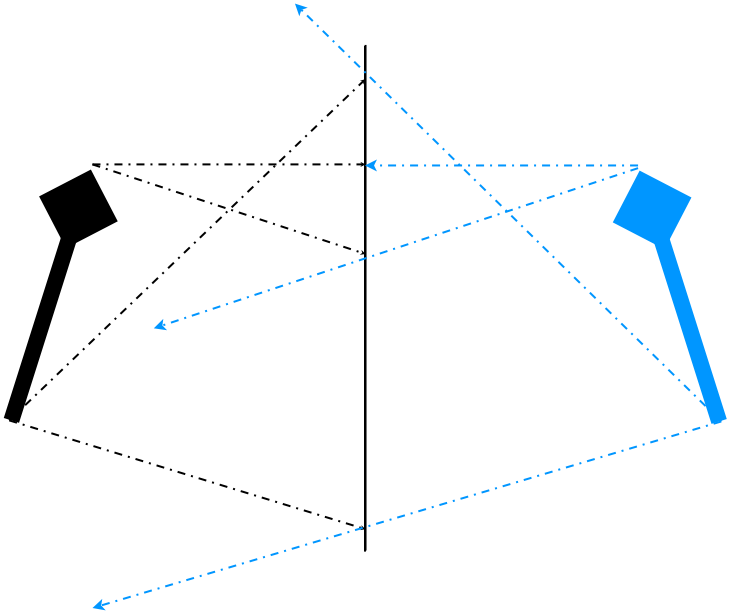
In order to locate an image formed by a mirror and object, you'll need to draw at least this many rays to locate a specific point of the image created…_____two_____

Here's a picture of a snowman to use as an object:

Where will the image be located?
Draw it!–Accurately!



Now, let's try that again, but with some rays this time…



To the left, you see a new object, with some incident rays drawn from the top and bottom. Using the law of reflection, draw in the reflected rays as precisely as possible.

Do the two reflected rays from the top of the object intersect? _____No_____

Would they appear to intersect if you extended them behind the mirror?_____Yes_____

Extend the reflected rays behind the mirror. [Hint to the last question!]

Where the two reflected rays from the top of the object appear to intersect behind the mirror, the top of the image would be formed. The same would be true for the two reflected rays from the bottom of the object. Draw in the image based on this information.

What can be said about the image distance compared to the object distance for a plane mirror?

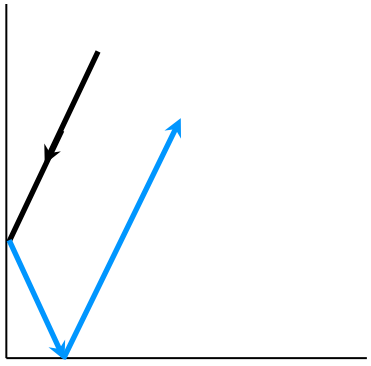
The image is the same distance behind the mirror as the object is in front of it.

What can be said about the image height compared to the object height for a plane mirror?

The image height is the same as the height of the object that formed it.

III. Multiple Mirrors

Below are two plane mirrors hinged together at one corner. This configuration is called a corner reflector when the angle is 90˚. One incident ray is shown. The angle of incidence is either 60˚ or 30˚, which is it? _____60_____ Why? It has to be measured from the normal line.



Draw in the ray as it hits the second mirror, and then as it finally exits the system of mirrors. Using algebra, geometry, or your scale drawing, what is the final angle of reflection?

Since the initial angle of incidence is 60, it will reflect at 60˚ from the first mirror. It is incident on the second mirror at an angle of 30˚ (by geometry) and will reflect at 30˚ from the normal line.

This means that the ray has undergone two 60˚ angle reflections and two 30˚ angle reflections for a total of 180˚. The ray has reversed directions and is parallel to the original ray! Cool! This always happens in a corner reflector.