

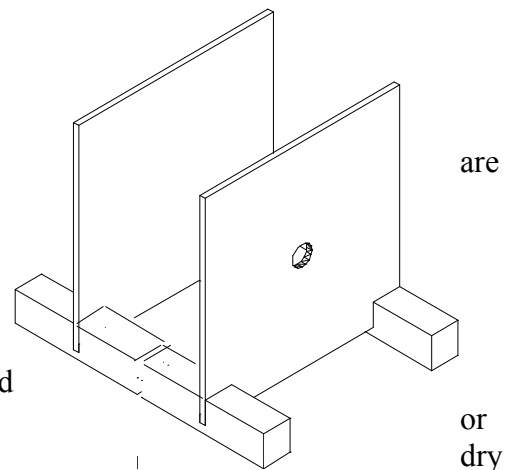
18605 Barbershop Mirror Set

Purpose:

A novel mounting holds two **thick, safe, plastic** mirrors vertically to investigate the formation of multiple images. The essential geometry is explored using particular angles between the two mirrors and also the special case when the mirrors approach being parallel. One mirror has a hole in the center for viewing. This apparatus is spectacular when set up in a glass cabinet where passers-by can view it without disturbing it. Comes with protective dust covers and slotted bases.

Initial Assembly:

To facilitate assembly, disassembly and storage, no permanent fasteners use with this product. Set the slotted base pieces in the appropriate locations and set each mirror slot in the slot of a base piece, while taking care to handle the mirrors only by the edges. **The polybag dust covers should be placed over the mirrors whenever they are not actually being used.** Plexiglas was used in this product for reasons of safety, but these surfaces are more easily damaged than those of glass mirrors. Avoid touching the front surface of the mirrors, and do not rub them with cloth paper towels. Light dust can be removed with a soft-bristled brush or a air stream.



Procedure:

By relocating one of each pair of base pieces, the mirrors can be placed on their side without falling over. The slot of the base piece engages the mirror directly and below the slot in the mirror. Then, the two free edges can be brought together and the angle between the two mirrors can be adjusted to find interesting imaging possibilities. If “n” is an integer, any angle between the two mirrors that is equal to $360^\circ/n$ will show $(n-1)$ images when an object is placed between the two mirrors. In the special case where $n = 4$, the central image appears just like the object in all respects. When you stand between two mirrors at right angles, the central image lets you see yourself as others see you. Try it! What happens to the writing on your tee shirt?

Let’s say a word about perverted images. Using either of the individual mirrors by itself, notice that the image is as far behind the mirror as the object is in front of it, but there is something different about the image. A careful look will show that the image is reversed front to back -- that means it is perverted. In the case of the mirrors at right angles, there is a reflection of a reflection. It seems then that the perverted image of a perverted image yields a normal one. How strange!

An easy way to set up this special case for $n = 4$ is to leave one mirror standing on its base, turn the other on its side, using one base piece as before, and bring the two together to form an exact corner. This can be left set up on a table or bench or glass fronted cabinet.

The best way to explore perverted images, and some other imaging issues, is with the two mirrors set up again as in the illustration. Here the mirrors are nearly parallel, and one can play with the alignment while looking through the hole. **This is the situation which gives the product its name, because there was a time when barbershops did have huge parallel mirrors on opposite sides so customers could see themselves and better instruct the barber.** One observation is that the mirrors can be arranged to approximate an infinite (or at least very large) number of images. These can appear to proceed in a straight line or veer off on a curve. The next observation is that an object placed between the two mirrors (better if on a diagonal) (best if it displays prominent lettering) will display first one side and then the other side of the object. An odd number of reflections produces a perverted image, and even number produces a normal image, as noted before.

Time Allocation:

To prepare this product for an experimental trial should take less than two minutes. Actual experiments will vary with needs of students and the method of instruction, but are easily concluded within one class period.

Feedback:

If you have a question, a comment, or a suggestion that would improve this product, you may call our toll free number.