Name _____ Date _____ Class _____

INTEGRATING MATHEMATICS

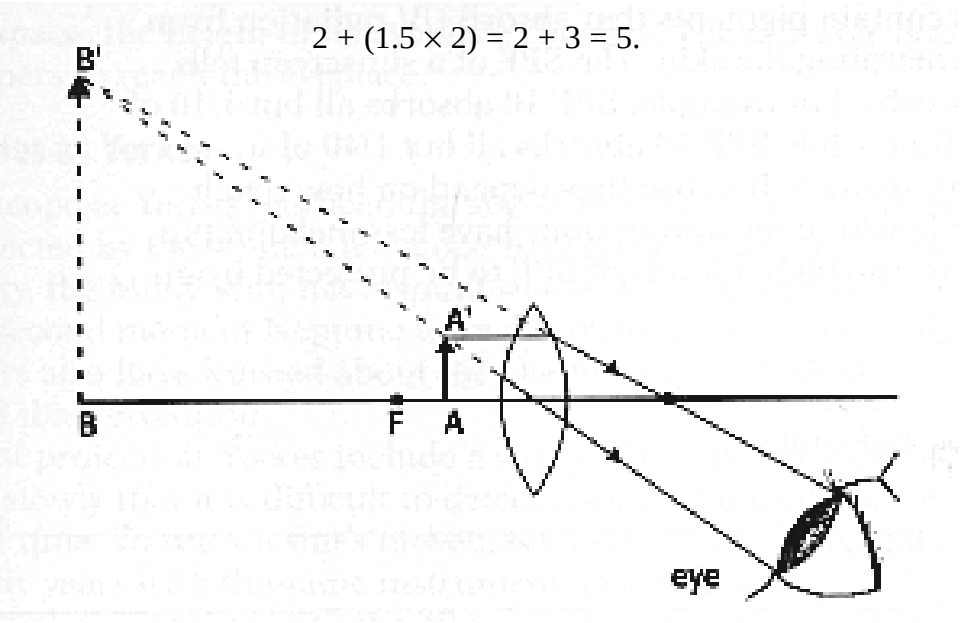
Bending Light Waves to Magnify

A magnifying glass is a lens designed to bend light waves in a way that forms a magnified, or enlarged, image. The magnification power of a lens refers to how big the magnified image is compared to the original image. If the magnified image appears twice as big, then the magnification is 100 percent or 1×. (The symbol × denotes 100 percent.) So, a 2 in. object appears 4 in. high. To get the size of the magnified image, use the following formula:

$$\textit{original size} + (\textit{magnification} \times \textit{original size}) = \textit{magnified size}$$

For the example above, we get $2 + (1 \times 2) = 4$. If the magnification is 1.5×, then we can calculate the size of the magnified image for the 2 in. object using the above formula:

$$2 + (1.5 \times 2) = 2 + 3 = 5.$$



You can estimate the power of a magnifier by placing a page with text on it under the magnifier. Move the magnifier away from the page until the text is out of focus. Then bring the page slowly back until the text is barely in clear focus. Measure the distance in inches from the center of the lens to the paper. This distance is the focal length. To calculate the magnification of the lens, divide the focal length into the number 10. For example, if the focal length of the lens is 5 in., the magnification is 10/5 or 2×.

Your Turn to Think

1. What is the magnification of a lens with a focal length of 2 in.?
2. How big would an object appear viewed through a magnifier marked 5×?
3. How large would a coin with a diameter of 3/4 in. appear through a 5× lens?