The *Light It Up* Game

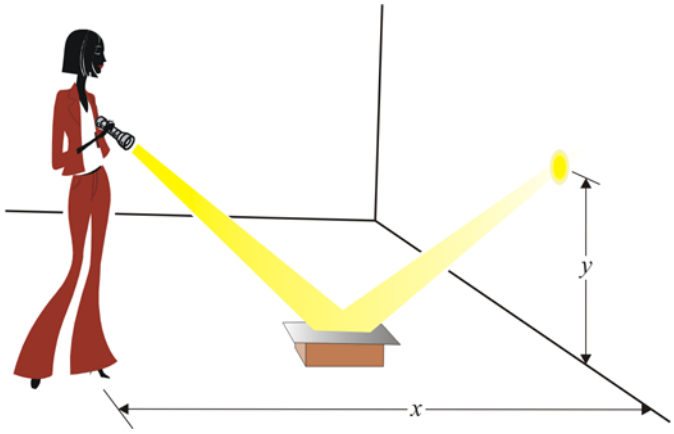
9. For this experiment, you will need:

- Laser pointer (or a small flashlight)
- Small, flat mirror
- Tape measures (2)
- Wooden block, about 10 cm tall (or a thick book)
- Tape
- Graphing calculator (optional)

a. Tape one of the tape measures to the wall, beginning at floor level. Place the other tape measure along the floor to measure the distance from the wall to the flashlight.

Place the block 25 cm from the wall. Place the mirror on top of the block.

Stand on the side of the mirror opposite the wall. Aim the laser pointer toward the center of the mirror so that its image is reflected onto the tape measure attached to the wall. (See figure at right.)



It is very important that you hold the laser pointer (or flashlight) at the same height throughout the experiment. Let x represent the distance from the wall to the laser pointer. Let y represent the distance that the reflection appears up the wall. Measure both x and y in centimeters.

b. What is the distance from the wall to the center of the mirror? _____

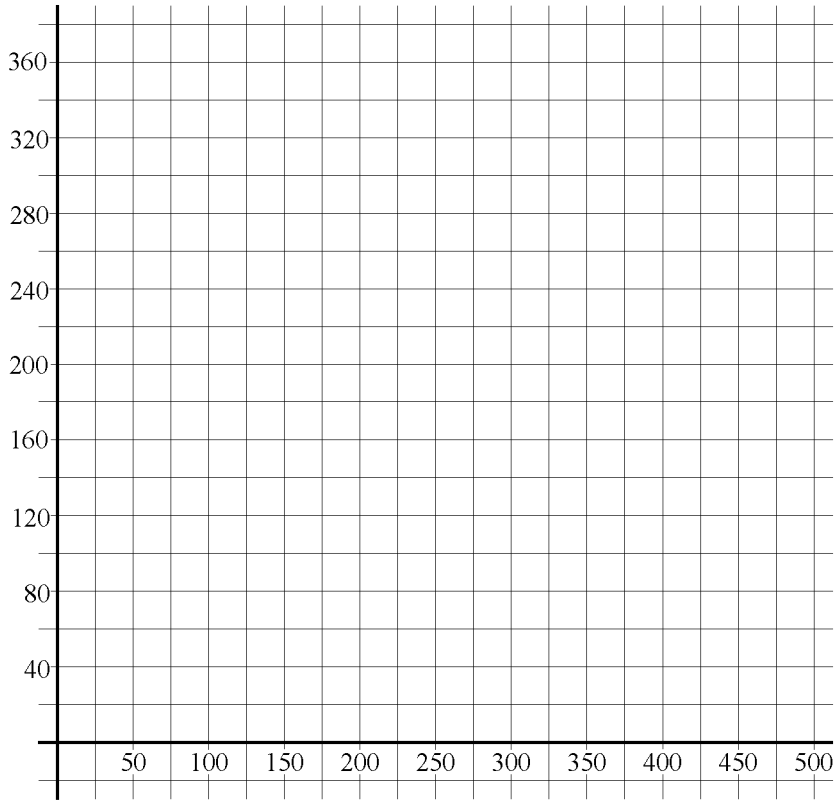
What is the distance from the laser pointer to the floor? _____

What is the distance from the floor to the mirror? _____

c. Collect at least eight data points and enter them in the table below.

DISTANCE FROM THE WALL TO THE LASER POINTER (x)								
DISTANCE FROM THE FLOOR TO THE REFLECTION (y)								

d. Sketch a graph of your data using the grid to the right.



e. Use the information in parts (a) and (b) to determine the values of b and c in the equation $y = \frac{a}{x-b} + c$.

b = _____

c = _____

f. Use your graph from (d) and the information from (e) to determine an equation for your graph.

Equation: _____

g. If the information in parts (a) and (b) is also true for Bart and Lisa's situation, determine the distance that they should stand from the wall if the target is . . .

i. 1 meter from the floor. _____

ii. 3 meters from the floor. _____

iii. 10 meters from the floor. _____