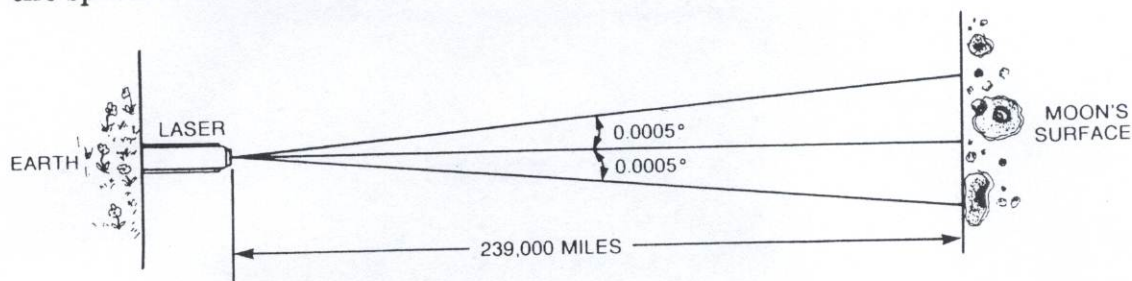


Exercise 6

- a. The students' drawings should appear generally as shown below, depicting the spread of the laser beam as it travels to the moon.



- b. The students should use the ratio of the lengths of the opposite and the adjacent legs equaling the tangent of the angle, then solve for the opposite leg.

$$\text{Tangent of angle} = \frac{\text{Opposite leg}}{\text{Adjacent leg}}$$

$$\tan 0.0005^\circ = \frac{\text{Half spread}}{239,000 \text{ mi}}$$

$$\text{Half spread} = 239,000 \text{ mi} \times \tan 0.0005^\circ$$

$$\text{Half spread} = 2.09 \text{ mi}$$

The beam will spread to a width of about 4.18 miles (that is, $2 \times 2.09 \text{ mi}$) by the time it reaches the moon.

Exercise 7

- a. The students' sketches should appear generally as shown below.

