**Firearms and Trajectory Worksheet**

**Objective**

1. Analyze the crime scene
2. Determine information about the shooter’s position

**Background Information**

Investigators will first measure how many feet the bullet hole is above the ground. Investigators then attempt to locate where the bullet originated and measure the distance from the two reference points. Next investigators measure the horizontal distance from the broken window to the bullet hole and compare this distance to the length of the bullet’s path from the hole in the car’s window to the bullet hole.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Calculation using Distance vs. Drop | | | | |  |
| \* Distance to window | | | = | Distance to shooter (c) | \* distance is placed in inches |
|  |  |  |  |  |  |
|  | Distance along horizon | |  | Distance to side of building |  |
| c = \_\_\_\_\_ | | |  |  |  |

Hypotenuse (c) = distance to the shooter

a = distance to the building

b = height of the shooter from the horizon (not from the ground)

Hypotenuse2 = a2 + b2

(Distance of shooter)2 = (Distance to side of building)2 + b2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| \_\_\_\_\_\_\_\_in2 | | | = \_\_\_\_\_\_\_in2 + b2 | | | | |  |
| \_\_\_\_\_\_\_\_ | in | 2 | - \_\_\_\_\_\_\_ |  | in |  | 2 = b2 |  |
| \_\_\_\_\_\_\_\_ | in | 2 = b2 | | |  | |  |  |
| \*\* b = \_\_\_\_\_in | | | ~ \_\_\_ft | | | | | \*\*convert from inches to feet |
|  |  |  |  |  |  |  |  |  |

Compare the distance from the building with the height of the bullet hole (determined from step # 6) and the horizon of the bullet.

Use this information to determine where the shooter was and at what height (or floor) the bullet originated

**Materials**

Calculator with sine function or tangent table

Ruler (optional)

**Scenario**

A victim was shot from a bullet that came through his front car window. Witnesses saw a muzzle flash from a nearby building, but were unsure from which floor the flash originated.

**Procedures**

1. Use the information below and the formula above to calculate and find the shooter.
2. The distance from the car to the building where the muzzle flash was seen is 60 feet (720 inches).
3. The entrance wound (bullet hole) on the victim is located 4 feet above the ground.
4. The distance along the path of the bullet to the window is 23.9 inches.
5. The distance along the horizon to the window is 23.5 inches.