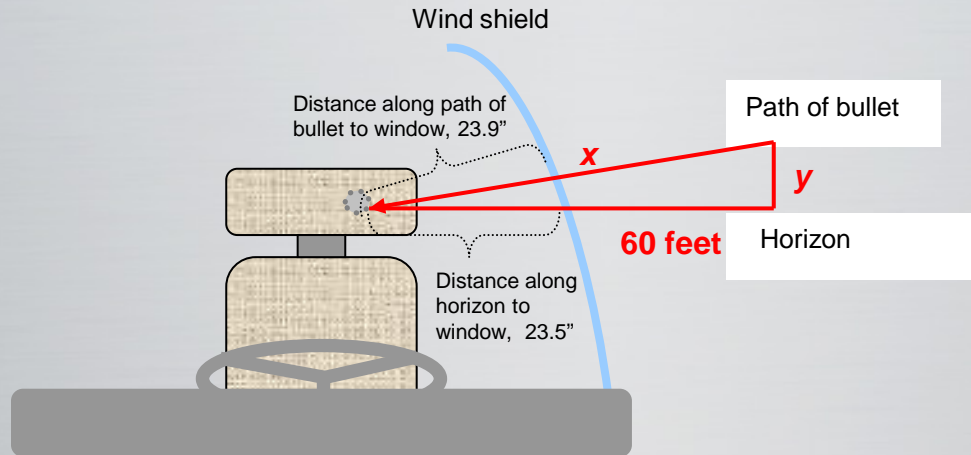


Catalyst:

**What does trajectory
mean? How is it used?**

Trajectory

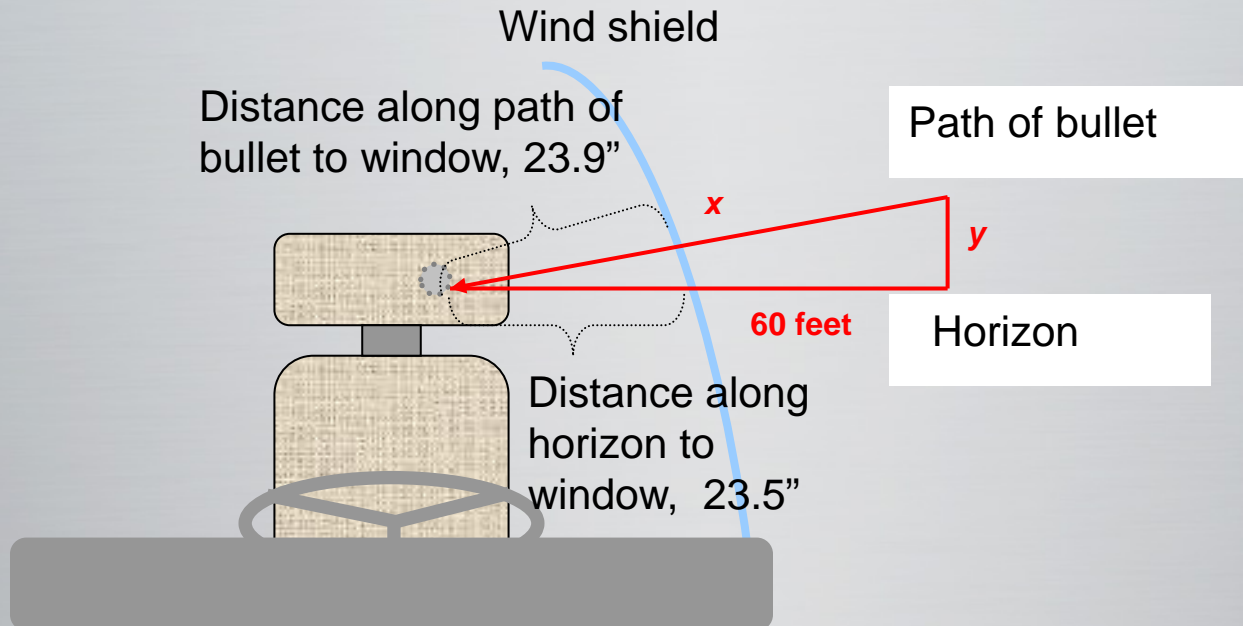


- Two reference points are needed to define the trajectory of the bullet – the PATH the bullet travels.

Trajectory

- Reference points can be bullet holes in objects or victims.
- An entry point and exit point on a victim can be used.
- Gunshot residue or spent cartridge casings can be less specific reference points.
- Investigators can use lasers to trace a straight-line path to help determine the position of the shooter.

Calculating Trajectory (Quick & Dirty Similar Triangle Method)

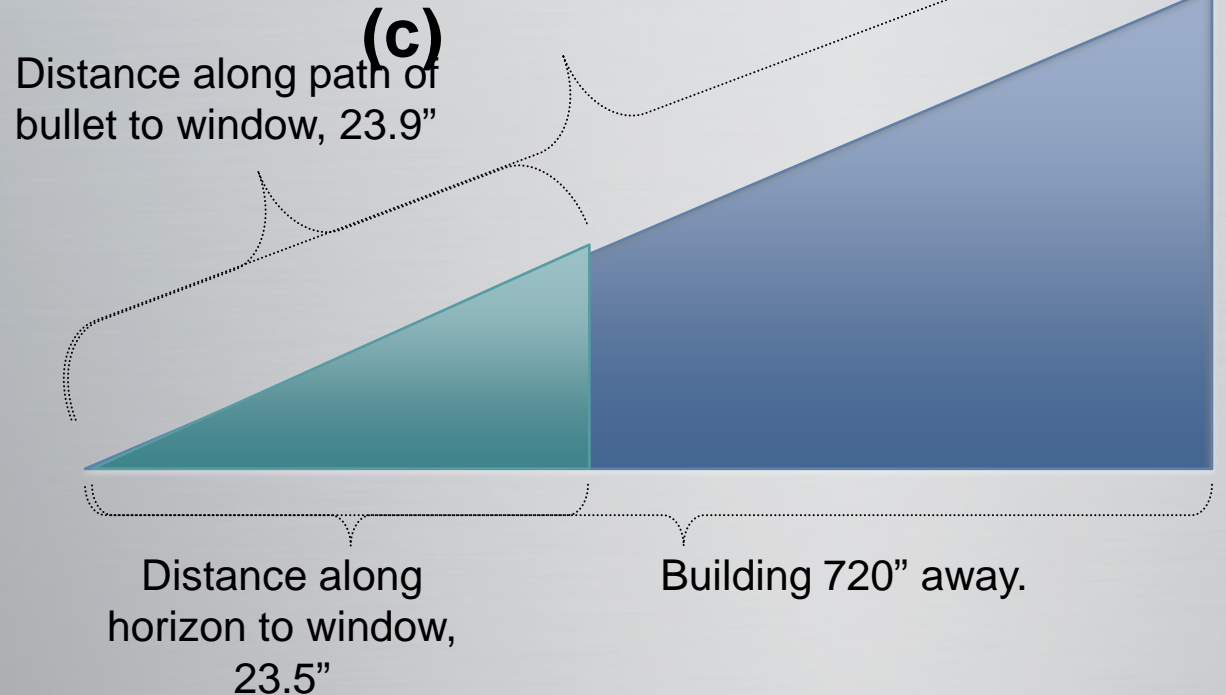


Given & Known Information:

- Building is 60ft (720 inches away)
- Distance from window to bullet entrance is 23.9in.
- Horizontal distance from window to bullet entrance is 23.5in.

Q&DSTM

**What is distance
from shooter to
bullet entrance?**



**What is the
height of the
shooter? (b)**

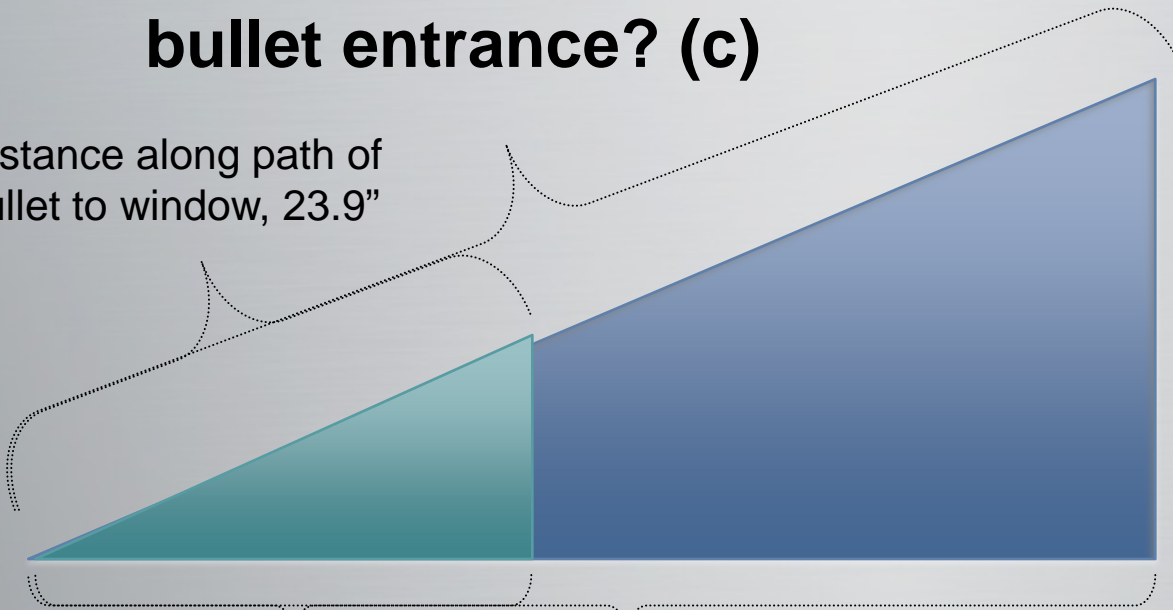
Q&DSTM

$$\underline{23.9''} = \underline{\quad c}$$

$$\underline{23.5''} \quad \underline{720''}$$

**What is distance
from shooter to
bullet entrance? (c)**

Distance along path of
bullet to window, 23.9''



Distance along
horizon to window,
23.5''

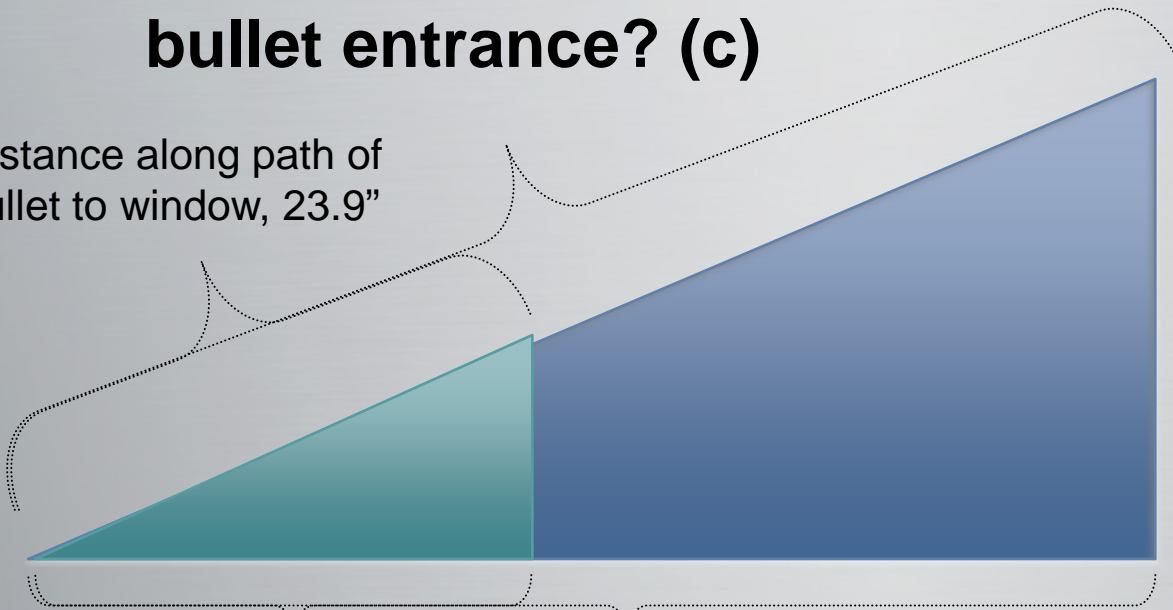
Building 720'' away.

Q&DSTM

$$\frac{720'' \times 23.9''}{23.5''} = c$$

**What is distance
from shooter to
bullet entrance? (c)**

Distance along path of
bullet to window, 23.9''



Distance along
horizon to window,
23.5''

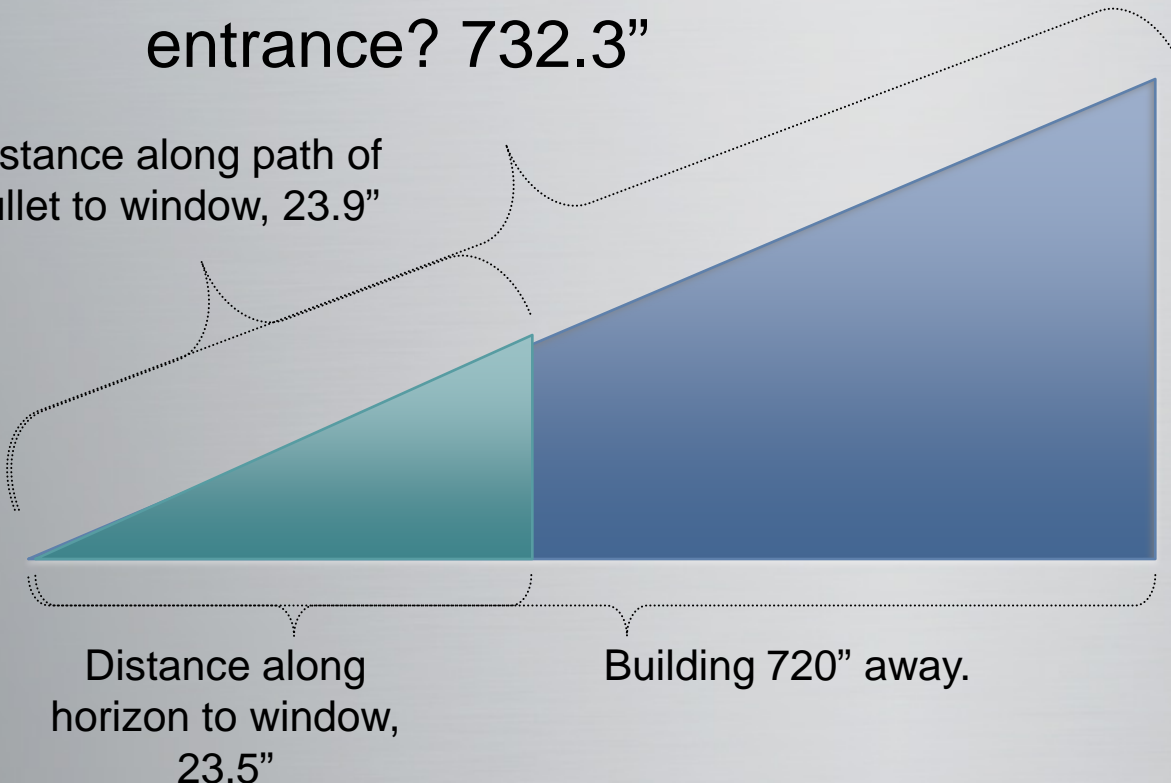
Building 720'' away.

Q&DSTM

What is distance from
shooter to bullet
entrance? 732.3"

Distance along path of
bullet to window, 23.9"

**What is the
height of the
shooter? (b)**



Q&DSTM

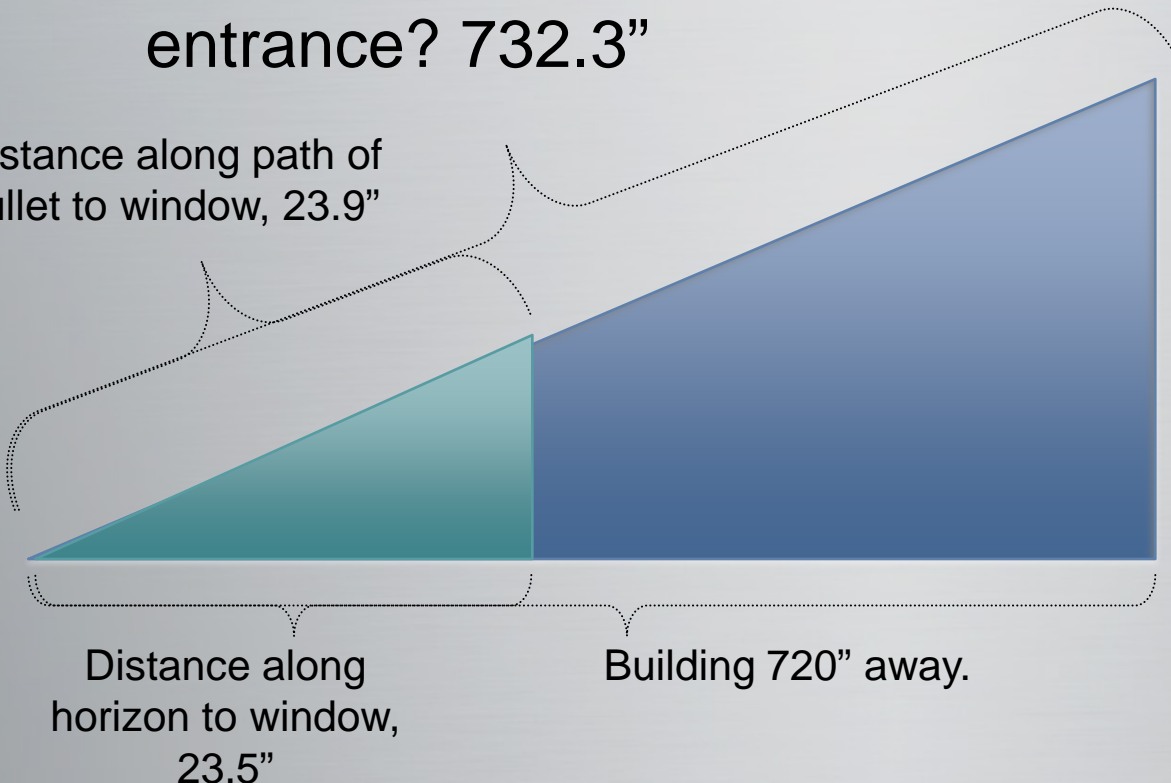
**Pythagorean
theorem!**

$$a^2 + b^2 = c^2$$

What is distance from
shooter to bullet
entrance? 732.3"

Distance along path of
bullet to window, 23.9"

**What is the
height of the
shooter? (b)**

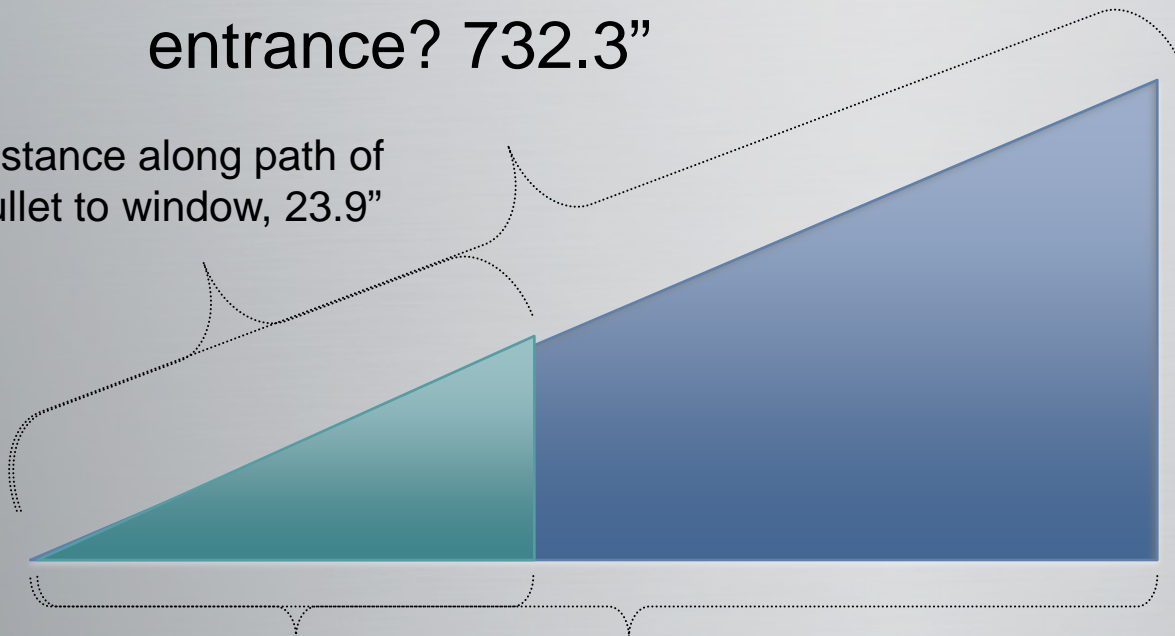


Q&DSTM

- $(732.3'')^2 = (720'')^2 + b^2$
- $536300 = 518400 + b^2$
- $536300 - 518400 = b^2$
- $17900 = b^2$
- $133'' = b$

What is distance from
shooter to bullet
entrance? 732.3''

Distance along path of
bullet to window, 23.9''



Distance along
horizon to window,

Building 720'' away.

**What is the
height of the
shooter? (b)**

Trajectory and Projectile Motion

- In groups brainstorm some ideas about this trajectory method:
 - How is the trajectory method used pretty accurate?
 - Where does the trajectory method breakdown? (where does it have problems)

Bullet Wounds

1. Why do entrance wounds tend to be smaller than exit wounds?
2. If the bullet penetrates clothing, what can fibers embedded in the wound indicate?
3. Where is gunshot residue usually found?
4. If the gun is fired with the muzzle touching the victim's skin, what telltale mark may show up?
5. Will larger or will smaller caliber bullets tend to lodge within the body rather than passing through? Why?