Expert Witness Report

MHF4U

Jin Hyung Park

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Reported by Jin Hyung Park **To the** VHS Court
On behalf of: the Expert mathematics Witness

Expert Witness Report ─ #56987

VHS Police Department
97865 Virtual Lane
Fallhedge, CA

Dated: *March 9, 2021*

Specialist field: *Mathematics, Criminology, Geometry*

On behalf of the Claimant/   *Expert Mathematics Witness*
Defendant (or both if single

Joint expert):

On the instructions of: *VHS Court*

Subject matter: *Murder Trial*

Contents

1. Introduction

- **1.1 About the Witness:**
  For the 360 (no scope) shooting on June 21st, 20XX, Jin Hyung has been named as the Expert Mathematics Witness. Criminology, geometry, and mathematics are among his qualifications. These abilities would enable her to decide which window the victim, was fired out of, allowing him to recognise the real suspect of the murder.

- **1.2 Purpose of Report:**
  The aim of this article is to use trigonometry to mathematically decide who committed the 360 (no scope) shooting out of the three suspects: N. O. Crime, M. E. Innocent, and Z. Jobs, who live on the 5th, 6th, and 7th floors of the 360 Trigonometric Apartment, respectively.

- **1.3 References:**
  - The document from the VHS P.D. Ballistics Lab by T. Cos
  - The document from the VHS Police Department by H. Sine

- **1.4 Persons Involved:**
  - B. John: the victim
  - N. O. Crime: 5th floor suspect
  - M. E. Innoncent: 6th floor suspect
  - Z. Jobs: 7th floor suspect
  - T. Cos: the witness
  - H. Sine, the crime scene investigator

  - The following groups involved:
    - The VHS P.D. Ballistics Lab
    - The VHS Police Department

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2. Information on the Incident

2.1. Background Information:

The 360 (no scope) shooting took place at the ten-story 360 Trigonometric Apartment on June 21 at 7:13 p.m. B. John, the victim, worked as a job counselor at Virtual High School. He was shot in the chest with a 9x19mm caliber rifle on his way home from a presentation about "University Admission during the covid-19 pandemic", and died from blood loss before medical help arrived. There are three suspects at the moment, all of which appear to be innocent.

2.2 Crime Scene Analytics:

The following details were provided by forensic technicians from the VHS Police Department: each floor on the 360 Trigonometric Apartment is 3.048 meters apart (including interstitial space), and the bullet's entry angle was $= \frac{5\pi}{12}$ radians.

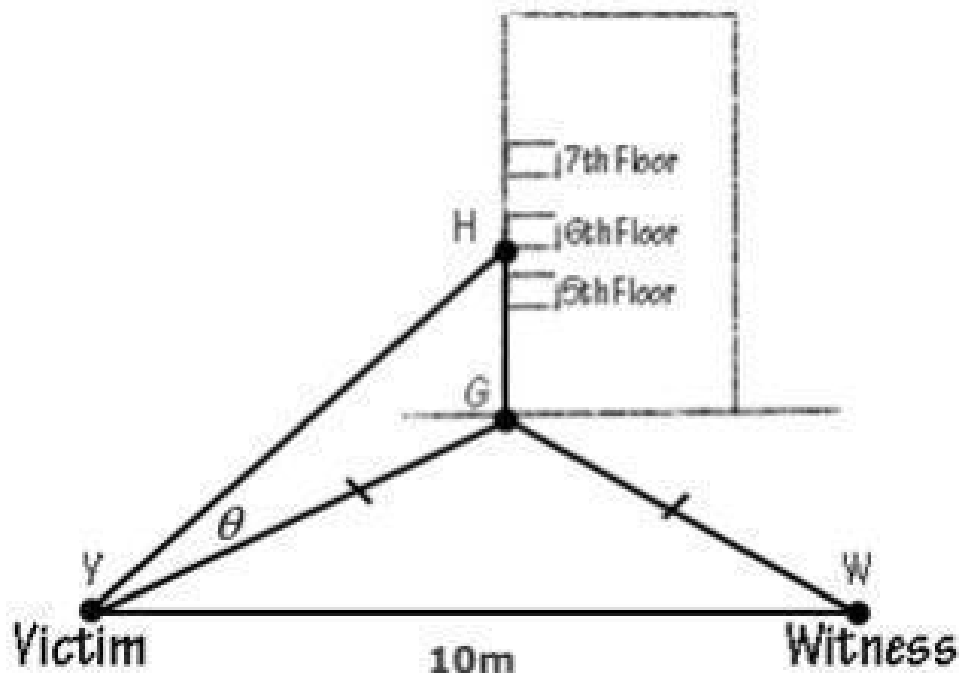### 2.3. Crime Scene Sketch:

Figure 1. Crime Scene Sketch (provided by VHS Police Department)

Angle "G" is $\frac{\pi}{2}$ radians, reminding the fact that the ground where the crime happened is perpendicular to the house (which is a three-dimensional system that we have lived.

3. Calculations

3.1. Introduction to Mathematical Concepts/Theory

- Triangle Inequality Theorem
  - The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
  - An isosceles triangle can be used to represent the distance between the suspect and the witness in relation to their equidistant distance from the apartment's front entrance, as seen in the crime scene sketch above. The victim and the witness were separated by 10 meters. As a result, the number of their equidistant lengths to the front doors must be greater than 10 meters, according to the theorem.
    - $2x > 10;$ x $states$ $distance$ $between$ the $victim$ $with$ $witness$ and the $front$ $doors$
  - An apartment floor stands at a height of 3.048 meters. As a result, either of the 360 Trigonometric Apartment's ten floors.
    - "n" is precisely 3.048(n-1) to 3.048n meters above ground level, floor to roof.

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- - The 5th floor is (12.19215.24) meters above ground level, the 6th floor (15.2418.288) meters above ground level, and the 7th floor (18.28821.366) meters above ground level.

- Tangent
  - $\tan(x) = \frac{opposite\ side}{adjacent\ side}$
  - For each of the specified floors in their upper and lower height ranges, the trigonometric ratio tan(x) will be used to measure the distance between the victim/witness and the front entrance.
  - If either of the results are less than or equal to 10 meters when doubled, one may be certain that the person who lives on that floor is mathematically innocent.
  - $tan(\frac{5\pi}{12}) = \frac{h}{x}$, within the interval: $2x > 10$ will be the final equation used to check the innocence or guilt of the 5th, 6th, and 7th floor defendants, while variable h represents a placeholder for the min/max heights of each floor.

3.2 The proof of innocence of 5th floor suspect

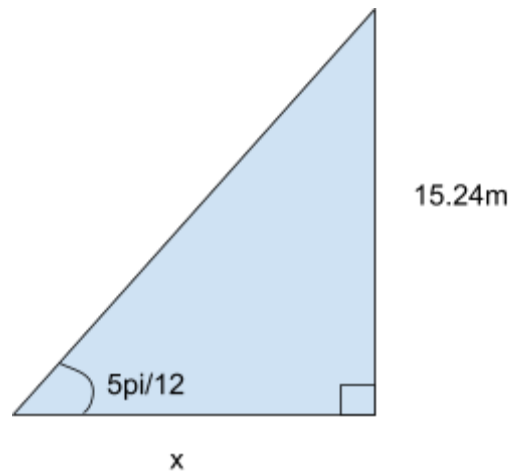- Minimum distance from the floor: 12.192 meters

5pi/12

12.192m

x

$tan(\frac{5pi}{12}) = \frac{12.192}{x}$

$x \bullet tan(\frac{5pi}{12}) = 12.192$
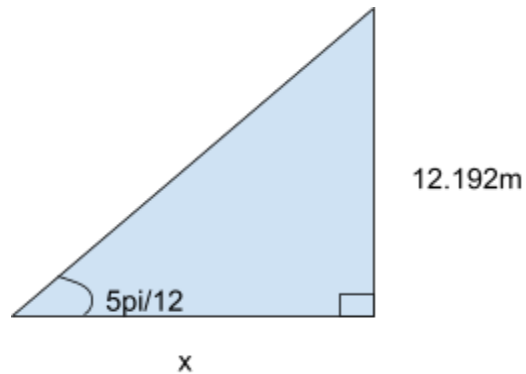
$x = \frac{12.192}{tan(\frac{5pi}{12})}$

$x \simeq 3.267$

- Maximum distance from the ceiling: 15.24 meters
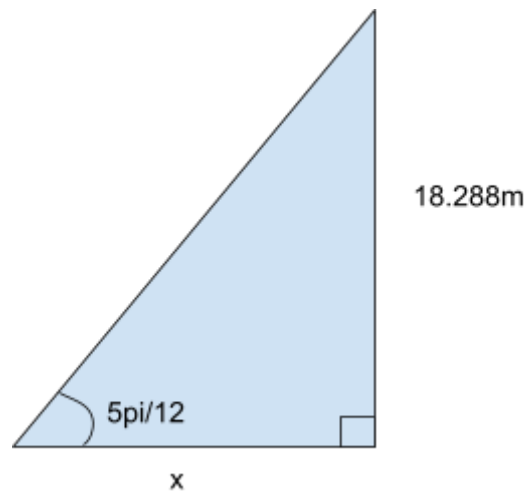
$$tan(\frac{5pi}{12}) = \frac{15.24}{x}$$

$$x \bullet tan(\frac{5pi}{12}) = 15.24$$

$$x = \frac{15.24}{tan(\frac{5pi}{12})}$$

$$x \simeq 4.084$$

3.3 The proof of innocence of 6th floor suspect

- Maximum distance from the floor: 15.24 meters
    - The Calculation is the same as the above.

- Maximum distance from the ceiling: 18.288 meters

$$tan(\frac{5pi}{12}) = \frac{18.288}{x}$$

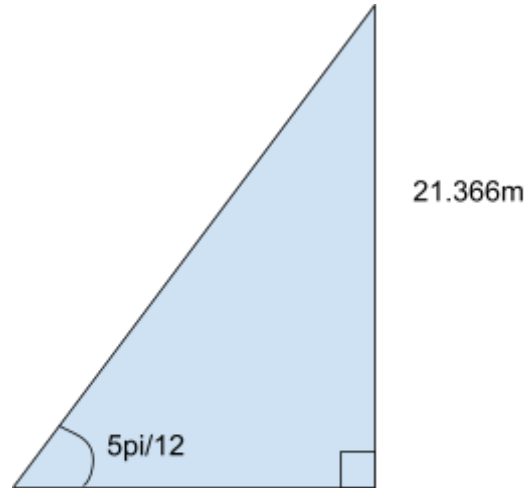$$x \bullet tan(\frac{5pi}{12}) = 18.288$$

$$x = \frac{18.288}{tan(\frac{5pi}{12})}$$

$$x \simeq 4.9$$

3.4 The proof of guilty of 7th floor suspect

- ○ Maximum distance from the floor: 18.288 meters
    - ■ same as the above
- ○ Maximum distance from the ceiling: 21.366 meters

21.366m

5pi/12

x

$$tan(\frac{5pi}{12}) = \frac{21.366}{x}$$

$$x \cdot tan(\frac{5pi}{12}) = 21.366$$

$$x = \frac{21.366}{tan(\frac{5pi}{12})}$$

$$x \simeq 5.717$$

3.5. The Explanation by applying Mathematics concept

The following are the height range of the floors.

- Within the height range of the 5th floor, side "x" measures (3.267–4.084 meters)

- Within the height range of the 6th floor, side "x" measures (4.084–4.9 meters).

- The height range of side "x" inside the 7th floor is (4.95.717 meters).

When doubled, the measure of side "x" provided the full height of the 7th floor is the only measure of side "x" that is greater than 10 meters.

As a result, Z. Jobs, a resident of the 7th floor, is the statistical victim of the 350 (no scope) shooting and the killer of B. Beaver, as proven by trigonometry.

4. Concluding Statement from the Witness

4.1. Declaration of Truth:

It is with my utmost confidence in my abilities as an expert mathematics witness that I conclude that I have truthfully determined the true perpetrator of the 360 (no scope) shooting. I have done all that I can within the confines of my duties in bringing justice to the wrongfully slaughtered victim - B. John.

I may appear in court to deliver this report in the prosecution of Z. Jobs, where I will publicly demonstrate my impartial findings.

END OF REPORT