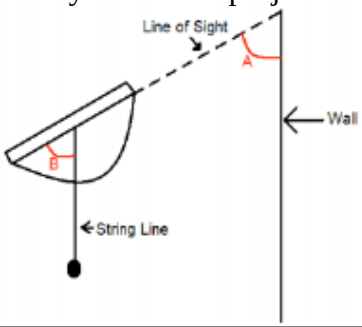
Geometry Honors **/65 points** **Name:** _____ **Hour:** _____

Your partner's name: _____

Quarter 3 Project: The Clinometer and Trigonometry

Complete Project Due Date: _____
(5 points deducted each block day late)

Directions: You will be working with a partner and turning in your individual projects together. Use a clinometer, tape measure, calculator, and trigonometry to solve the problems. Give your answers in feet. Round everything to the tenths place. No help from the teacher will be given the day before the project is due and on the day the project is due.



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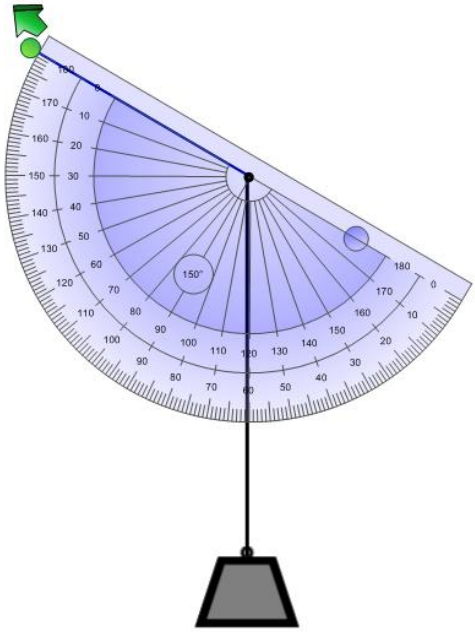
(1) Preliminary Project Question: Observe the picture of the clinometer below to the left. Let's suppose that you are measuring the height of a tree and your clinometer looks like this. You are standing 12 feet horizontally from the base of the tree. Your eye height is 5 feet. What is the height of the tree? Draw a detailed picture and show all your work in an organized manner.



Height of tree = _____feet

(2) Classroom Question: Find the height of our classroom. You will measure it directly with a measuring tape. You will also measure it by using a clinometer. You will find a direct measurement to the base of the wall from where you are using the clinometer. Show very detailed pictures and clear work.

(a)Vertical Measurement:

Actual height of the classroom (measure it directly with your tape measure): _____inches

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____**feet**

(b)Clinometer Direct Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle: _____

Angle of Elevation (90° – Clinometer Angle): _____

Your horizontal distance to the base of the wall: _____ in

Your calculated height of the classroom (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____**feet**

(3) First Field House Hallway Question (The Window): Your task is to measure the height of the top of the window, just below the silver window frame (the top of the iridescent part of the top window), with respect to the hallway floor. Because there is inaccuracy with measuring, do three calculations. Two should involve direct measurement to the window (measure your horizontal distance to the window as you use the clinometer). The third should involve an indirect measurement to the window (find two clinometer angle measurements and measure the horizontal distance that was between your two positions). Show very detailed pictures and clear work.

(a) First Direct Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle: _____

Angle of Elevation (90° – Clinometer Angle): _____

Your horizontal distance to the base of the wall: _____ in

Your calculated height of the window (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____**feet**

(3) First Field House Hallway Question (The Window):

(b) Second Direct Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle: _____

Angle of Elevation (90° – Clinometer Angle): _____

Your horizontal distance to the base of the wall: _____ in

Your calculated height of the window (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____feet

(3) First Field House Hallway Question (The Window):

(3c) Indirect Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle #1: _____

Angle of Elevation #1 (90° – Clinometer Angle #1): _____

Distance Between the Two Angle Measurements: _____in

Clinometer Angle #2: _____

Angle of Elevation #2 (90° – Clinometer Angle #2): _____

Your calculated height of the window (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____feet

(4) Second Field House Hallway Question (The Orange Bulldog): When you walk into the field house/pool entrance from the parking lot, there is a sculpture of an orange bulldog above you. Your task is to measure the height of the Bulldog's eyes, with respect to the floor. You will need to find an indirect measurement to the Bulldog's eyes (find two clinometer angle measurements and measure the distance that was between your two positions). Show very detailed pictures and clear work.

(4a) First Indirect Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle #1: _____

Angle of Elevation #1 (90° – Clinometer Angle #1): _____

Distance Between the Two Angle Measurements: _____in

Clinometer Angle #2: _____

Angle of Elevation #2 (90° – Clinometer Angle #2): _____

Your calculated height of the bulldog's eyes (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____**feet**

(4) Second Field House Hallway Question (The Orange Bulldog):

(4b) Second Indirect Measurement:

Eye height of the person who is using the clinometer: _____ in

Clinometer Angle #1: _____

Angle of Elevation #1 (90° – Clinometer Angle #1): _____

Distance Between the Two Angle Measurements: _____in

Clinometer Angle #2: _____

Angle of Elevation #2 (90° – Clinometer Angle #2): _____

Your calculated height of the bulldog's eyes (using your clinometer and trigonometry): _____in

Now, use unit multipliers to find the height in feet. Round to one decimal place. Show your work!

_____feet

(5) You were asked to find more than one measurement in #3 and #4.
(*Be specific in your explanations and use full sentences.)*

- Compare your two answers from #3a and #3b.

- Compare your two answers from #4a and #4b.

- What do you think would account for these differences? Name at least three.

(6) Give a real-world example/situation where you would want to find the height of something that you can't measure directly or can't measure directly with a clinometer. Explain why you would have to use indirect measurements. (*Be specific in your explanations and use full sentences.)*

(7) What happened to the angle of elevation as your distance from the object increased? Show a picture.
(*Be specific in your explanations and use full sentences.)*

(8) GeoGebra: Use GeoGebra to find the height of the Bulldog's eyes.

(a) Using a digital camera, take a picture of a person standing by the Bulldog, and import it into GeoGebra. Have GeoGebra calculate measurements to help you determine the height of the Bulldog's eyes. Save your GeoGebra file as "shared".

(b) You must **show your work on this page** to communicate how you arrived at the answer (the actual height of the Bulldog's eyes in feet) showing correct mathematics. Draw a sketch of your GeoGebra measurements that you are using in your solution.

(c) You must submit your GeoGebra link into **Canvas**.