



Geometry B
Module 7

Student Name: _____ Teacher Name: _____

As you work through the chapters in your Geometry course, you will be encouraged to think and to make conjectures while you persevere through challenging problems and exercises. You will make errors – and that’s okay! Learning and understanding occur when you make errors and push through mental roadblocks to comprehend and solve new and challenging problems.

Text: *Geometry Common Core*, Big Ideas, 2015

**To ensure you are learning, you must show your work for all exercises.
YOU WILL NOT EARN CREDIT FOR ANSWERS WITHOUT WORK.**

Chapter 9: Right Triangles and Trigonometry (9.1-9.7)

- _____ Maintaining Mathematical Proficiency (page 461): Complete exercises #1-12 **all**
- _____ 9.1 The Pythagorean Theorem: Read the lesson and complete exercises #3, 4, 7, 8, 11, 12, 21, 36
- _____ 9.2 Special Right Triangles: Read the lesson and complete exercises #1, 3, 4, 5, 7, 8, 9, 11, 12, 15, 19, 26
- _____ 9.3 Similar Right Triangles: Read the lesson and complete exercises #1, 3, 4, 5, 6, 11, 12, 13, 15, 19, 20, 21, 28, 46, 47, 48, 49
- _____ 9.4 The Tangent Ratio: Read the lesson and complete exercises #1, 3-11 **all**, 22, 27, 28, 29
- _____ 9.5 The Sine and Cosine Ratios: Read the lesson and complete exercises #1, 2, 5, 6, 7, 11, 12, 13, 15, 16, 17, 19, 20, 21, 30, 54, 59, 60, 61
- _____ 9.6 Solving Right Triangles: Read the lesson and complete exercises #1, 3-9 **all**, 11, 13-18 **all**, 33, 34, 35
- _____ 9.7 Law of Sines and Law of Cosines: Read the lesson and complete exercises #3, 4, 5, 9, 10, 13, 14, 18, 19, 22, 25, 33, 37, 53, 54

Students must complete the Chapter Review and Project with a teacher or tutor at school.

- _____ Chapter Review (pages 518-522): Complete exercises #1-23 **all**
- _____ Complete the attached Project (**No project = No credit**)

A teacher or tutor reviewed the Chapter Test with the student

Date: _____ Signature: _____

<i>Grade</i>

Geometry Project
Module 7: Right Triangles and Trigonometry
Textbook Pages 461-524

The Pythagorean Caper

There has been a break-in at the local museum. Valuable artifacts have been stolen. Two windows have been breached (broken into) and it is suspected that the perpetrator used a very tall ladder to enter or leave the museum through these windows. The authorities are hoping that learning more about this unusual ladder will provide clues to identify a suspect.

Near the first window, two indentations were found on the ground 16 feet away from the base of the building. It is suspected that the feet of a ladder created these indentations. The first breached window is 30 feet high off of the ground. Investigators need to determine approximately how tall the ladder was.

Task #1: Use the information provided to sketch and label a diagram of the crime scene and find the length of the suspected ladder used. Use your ruler, straightedge and tools available to create a quality sketch with accurate labels. Draw your sketch in the space below.

What is the length of the ladder? _____

Assumption #1: It is assumed that the wall of the building is “plumb” -- that means that the wall rises perpendicular to the ground.

Why do you think this assumption is given? State what makes it relevant to the scenario.

Investigators have determined that a second window breached at the museum was 33 feet off of the ground. No obvious indentations were found on the ground near the second window and we are not sure where the foot of the ladder was located.

Task #2: Use this information to sketch and label a diagram of the crime scene and consider the length of the suspected ladder used in the previous problem. Please show your work on the below and demonstrate any formulas or mathematical properties that come into play.

Task #3: Assuming the building is “plumb” (perpendicular to the ground), use your calculations to answer the following questions.

1. Is it possible that the same ladder was used to breach the second window? Use what you know about the properties of triangles to explain your answer.
2. If so, approximately where on the ground could we look for evidence of where the ladder was based?
3. How could this information possibly lead us to conclusions about the suspect entering and exiting the museum?

The authorities have video evidence of a possible suspect in the museum break in. The suspect was seen carrying a briefcase measuring 20" long by 16" high by 3" wide. One of the artifacts stolen was 24" long and 2" wide. Investigators are trying to determine if this artifact was possibly smuggled out of the museum in this suspect's briefcase.

Task #4: Use this information to sketch and label a diagram of the briefcase and the artifact that was stolen.

Task #5: Use the dimensions provided to determine mathematically if the investigators' suspicions are possible. Show all work and provide relevant properties and formulas.

Will the artifact fit in the briefcase? _____

Why or why not? (Provide a written summary of your mathematical findings.)

Investigators have discovered that a large painting was stolen from the museum. Use your math skills to determine if the painting was smuggled out of one of the museum windows or not. The museum windows were all intact and are all the same measurement 24" wide by 24" tall. The large painting that was stolen was 35" wide by 36" tall.

Task #6: Based on the information given, perform the mathematical steps necessary to determine if this painting would have fit through the window. This information will help lead to a suspect and may also be used in court as evidence. So make it look official!

Would the painting fit through the window? _____

Why or why not? (Provide a written summary of your mathematical findings.)
