

Roof Pitch

A Practice Understanding Task

Purpose: In this activity students will act as a builder specifically choosing the roof pitch for a new barndominium to allow for a possible second floor in the future and calculating materials needed.

Career Field:

Architecture

Triangle Residential Designs, INC.

WTCC Associate Program of Study and Contact Person:

Architectural Technology

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NC Math 4 Standards:

AF.2.2: Implement Law of Sines and Law of Cosines to solve problems.

Unit Alignment:

NC Math 4 - Unit 1: Law of Sines

Common Core State Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
5. Use appropriate tools strategically.
7. Look for and make use of structure.

Prerequisite Skills

- Using right triangle trigonometry and the Law of Sines to solve triangle problems.

Time Required

The time required to complete this activity is approximately 90 minutes.

Materials Needed

- Desmos or calculator

The Teaching Cycle:

Launch:

Before passing out the student activity sheet, ask the students to research roof pitch. What are the options for roof pitch? When is one pitch best? What factors affect the roof pitch a builder should choose? How does the roof pitch affect roofing materials?

https://en.wikipedia.org/wiki/Roof_pitch

DESMOS activity and launch video

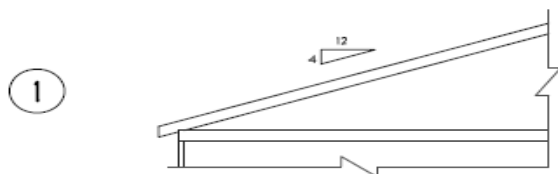
Explore:

Students should work in groups. One option is to give each group a different pitch and have them research pros and cons of that specific pitch (ex. where would you find that pitch, what materials could that roof be constructed from, how much space could be utilized in a second story with that specific pitch). When groups begin to work on Task 2, be sure they are comprehending the building code correctly. You may want to use a similar example to explain what the building code allows for square footage. Each group could present their findings to the class with visuals.

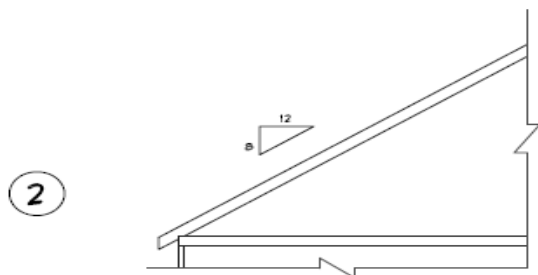
Discuss:

What was unclear about the project? What could make it better?

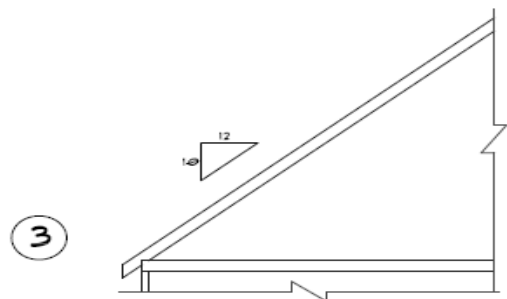
Exit Ticket options:



WHAT IS THE ANGLE OF
THIS ROOF PITCH? _____



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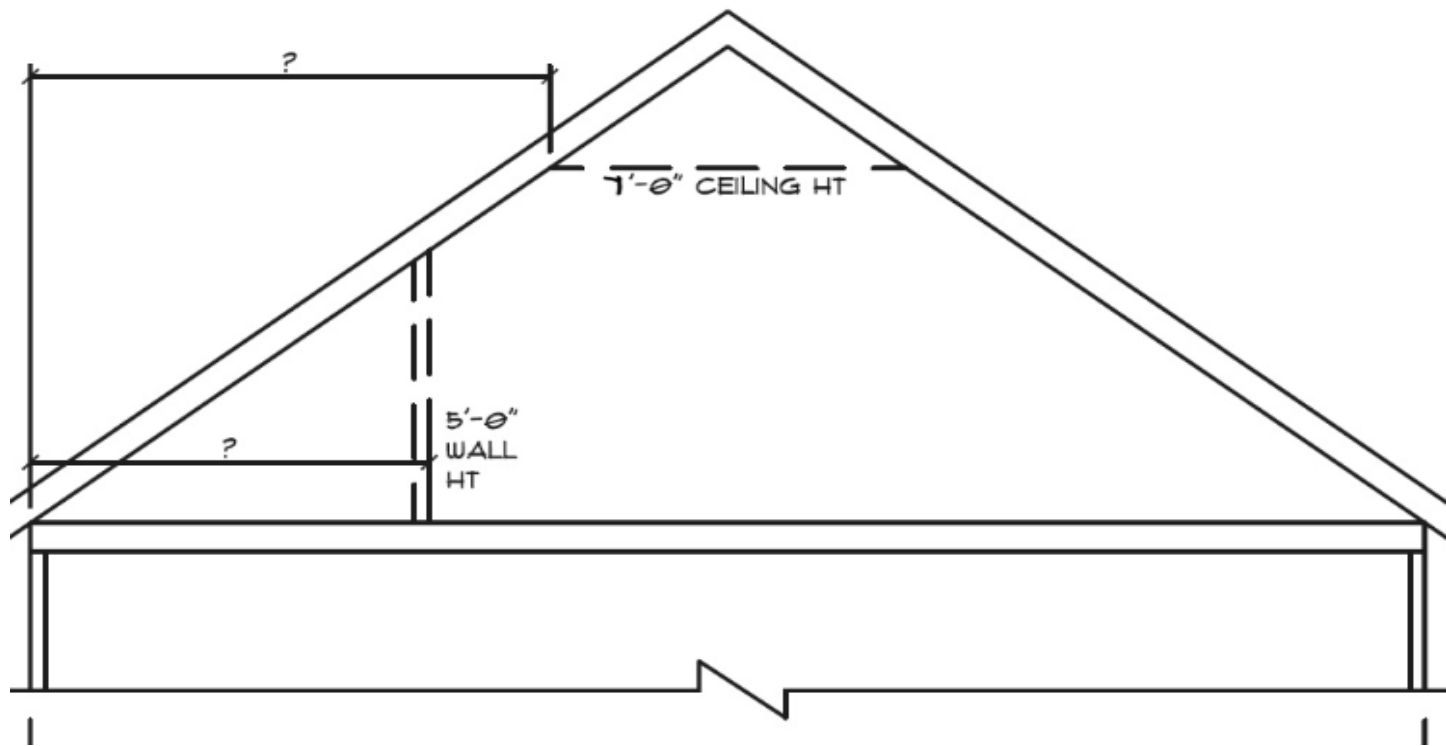


WHAT IS THE ANGLE OF
THIS ROOF PITCH? _____

Find the square footage of a second floor that has at least a 7 foot ceiling if the roof pitch is 8:12 and the floor rectangular dimensions are 40 feet by 40 feet.

Example assessments for testing:

1. How many 4 ft by 8 ft sheets of plywood are needed to roof a one story building with floor dimensions 120 ft by 100 ft (no overhang) and with a 10:12 roof pitch? (building width is 100 ft)
2. What percentage of the second floor living area in question 1 above will have a sloped ceiling between 5 ft and 7 ft? (The 5 foot wall is needed on both sides.)



[Student Activity Sheet](#)