

Name: _____ Period: _____ Date: _____

Pythagorean Firefighters to the Rescue: Application of Pythagorean Theorem **Math 8**

Have you ever wanted to be a firefighter?

Have you ever been to a firehouse, or seen the fire trucks and equipment?

Well today you are part of a squad of firefighters in the **Pythagorean Firefighter Company**.

- Once you are split into squads, write your Engine # _____ and list your squad team members here:



- Make sure you have your 7 “ladders” which are strips of paper or sticks of different lengths. They are blank, but you have rulers to measure them if needed. The ladders are cut to lengths using inches. The scale for these scenarios is 1 inch= 1foot. That means if you use your 12 inch paper ladder, it represents a 12 foot ladder for the scenario. Be sure to indicate units in feet for the real world scenarios at each station.
- Take this worksheet and go to your first station.
- You will have 5-6 minutes at each station. Your job is to read the scenario and save the day.
- You **MUST** record your data, measurements and sketch a model for each scenario.
- Choose a ladder before time runs out!



FIREFIGHTERS to the RESCUE!

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First you must complete the pretraining below, then you may find your station and begin.



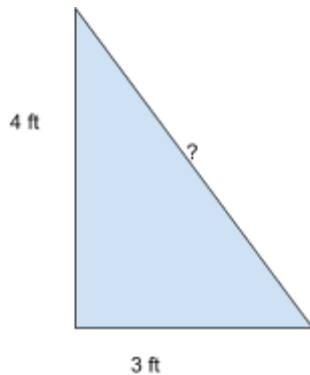
PRE-TRAINING:



What is a hypotenuse?

What is the equation for the Pythagorean Theorem?

Find the missing side: (Note to designer - provide a right triangle with leg side lengths 3 and 4. Put c on the hypotenuse - students will solve for c: similar to below)



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Stations and Scenarios - You may not visit the stations in order, so be sure to keep track of your work in the correct place. *(Teacher - you can cut these out and leave copies at each station)*

*Students MUST: Take measurements in inches, sketch the scenario, label side lengths and solve the problem. Write the answers in **feet** for the units. Remember the scale is 1 inch=1 foot.*

(note - designer can provide a blank right triangle for students to label, or the spaces below can be blank workspace)

Station 1:



A cat is stuck in a tree. She is on a branch that is 12 feet off the ground. If you can set your ladder anywhere from 4-5 feet from the base of the tree, what length ladder do you need?

Station 2:



There is a fire on the third story of a building. You can see flames coming out of a window, so you decide to put a ladder to the window next to it. The window is 36ft high. What size ladder do you need if you place the ladder 15 ft from the bottom of the building?

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Station 3:



An air conditioning unit on the roof of the school building needs to be inspected. If you use your 50 ft ladder, and place it on the ground 14 feet from the edge of the building, how tall is the school roof?

Station 4:



At a town celebration, a ladder truck is parked and has an American flag flying from one of the ladders that is sticking into the air. If the flag is flying from a 60ft ladder, and the truck is 36 ft long, how high is the flag from the truck?

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Station 5:



The fire has been extinguished, but the stairway is blocked. Firefighters must get the people out of the building. There's a balcony 24 feet up, what size ladder do you need?

Station 6:



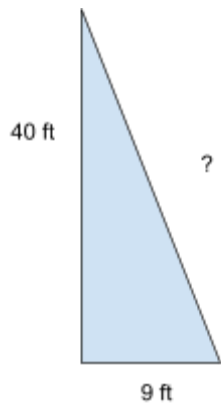
Did you know that a cow can walk up stairs but not down them if they are too steep? There's a cow 8 feet up in the barn and she needs help! If you can get up there to lower down a ramp and lead her down, then she will be safe. What size ladder do you need? Be sure to use a ladder from your choices and also show how far the ladder needs to be placed.

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Did your ladder choice save the day?

1. Which scenario was the most difficult? Why?
2. Did you see any patterns? Explain.
3. Which dimensions or factors do firefighters have to think about or adjust in order to reach different heights?
4. Find the length of the ladder: (Note provide a right triangle with the 9 and 40 labeled on the legs, and the "ladder"/hypotenuse labeled "c" or "?" (triangle: 9, 40, 41) Similar to image below:

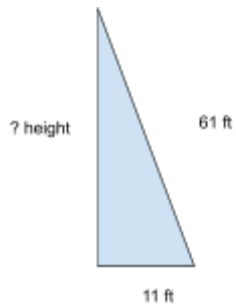


note - can it look like a building and a ladder leaning against it?

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5. Find the height of the building: (Note: show a right triangle with the 11 along the base leg and 61 for the hypotenuse. Label the height as "b" or "h" (triangle 11, 60, 61))



note - please make it look like a building with a 61 foot ladder leaning against it and the height of the building is the unknown?

6. How far must the ladder be if the ladder is 25 ft long and needs to reach a window that is 24 ft high? Sketch a diagram and label it.