Pythagorean Theorem Review WS #2

THE PRINCESS OF POLYGONIA

The beautiful young princess of Polygonia is very distressed. Her father has chosen a husband for her: a very rich, but very old king from another land. However, the princess is in love with someone else. In order to ensure that the princess will not escape and elope with her prince charming, her father has locked her in the tower until the old king arrives for the marriage.

She could escape through the window, but it is 50 feet above the ground (rather a long distance to jump). An alligator-infested moat, which is 10 feet wide, surrounds the tower. Naturally her prince charming is planning to rescue her. His plan is to use an arrow to shoot a rope up to her window. She can then slide down the rope to the other side of the moat into his waiting arms, and off they will ride on his beautiful stallion.
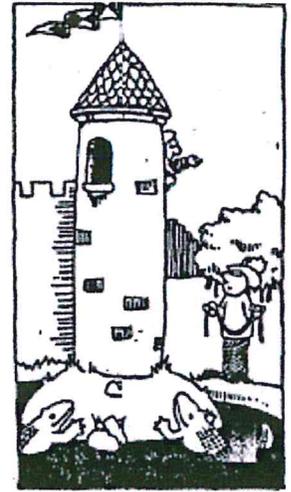
However, even though the prince is charming, he is not too bright. Every night he has tried to rescue the princess with a rope that was too short. The old king arrives tomorrow and the prince needs your help. Remember: this is his last chance to rescue the princess!

With your study team, find the minimum amount of rope the prince needs. (Assume they need an extra 1.5 feet of rope at each end in order to tie the rope). Write a complete explanation for the prince, including a diagram, that shows how to determine the minimum length of rope needed.

THE BUCKLED RAILROAD TRACK

Railroad designers are always looking for ways to improve safety and comfort of train travel.

Suppose technology made it possible to make and transport straight rails one mile long. If one winter two pairs of these rails were installed along a two mile portion of track in the desert, then each rail would expand approximately one foot in length in the summer heat. Suppose that instead of buckling, these rails keep their (straight) shape. In this case, the ends where they meet could jut upward to form a triangle. How high above the ground would the ends of the rails be?
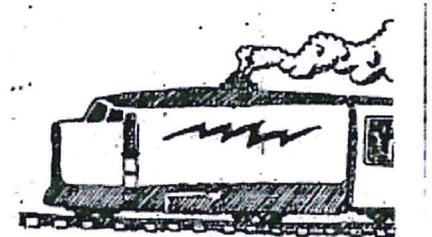
Let H be the height (in feet) of the tracks above the ground where the two rails come together.

a.) How large do you think H is? Is it big enough for you to stick your arm between the ground and the tracks? Is it big enough for you to walk through? Could you drive a car under the buckled tracks? Make a guess.

b.) Draw a picture and calculate H. (Note: a mile is 5280 feet long).

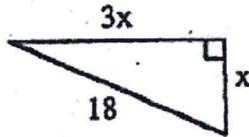c.) How does your calculated value for H compare with your guess in part (a)?

BP-26
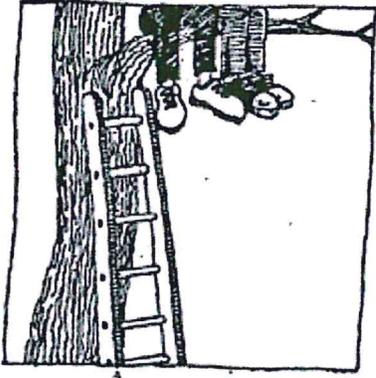
A 10 foot ladder is leaning against a tree. The foot of the ladder is 3.5 feet away from the base of the tree trunk.

a.) Draw a diagram and label the ladder length and its distance from the tree.

b.) How high on the tree does the ladder touch? Write an equation and solve it.

BP-98

Solve for x.

BP-85

One leg of a triangle is 5 inches shorter than the hypotenuse. The other leg is 15 inches long. How long is the hypotenuse?

BP-39

Find the distance between this pair of points: (5, -8) and (-3, 1).