

Pythagoras Mini Project

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10th

Our Problem:

A football player in a rectangular field with a length of 100 meters and a width of 60 meters, wants to run from one corner of the field to the other. Then the ball goes to the other side of the field 75 meter away from the players initial starting point and he has to run to be able to get it, later on the player decides to run to his teammate at the top left corner of the field. What is the distance from the initial starting point to the other corner of the field? What is the distance from the player and the ball? And what is the distance from the player to his teammate? Are the three last standing points of the player a right triangle?

How did we solve it?

Triangle 1:

$$a^2 + b^2 = c^2$$

$$60^2 + 100^2 = c^2$$

$$3600 + 10000 = c^2$$

$$c = \sqrt{13600}$$

$$c = 116.6 \text{ meters}$$

Triangle 2:

$$d^2 + e^2 = f^2$$

$$60^2 + 25^2 = f^2$$

$$3600 + 625 = f^2$$

$$f = \sqrt{4225}$$

$$f = 65 \text{ meters}$$

Triangle 3:

$$g^2 + h^2 = i^2$$

$$60^2 + 75^2 = i^2$$

$$3600 + 5625 = i^2$$

$$i = \sqrt{9225}$$

$$i = 96.04 \text{ meters}$$

Is triangle 4 a right triangle?

$$\text{Is } 65m^2 + 96.04m^2 = 100m^2?$$

$$j^2 + k^2 = m^2$$

$$65^2 + 96.04^2 = m^2$$

$$4225 + 9223.68 = m^2$$

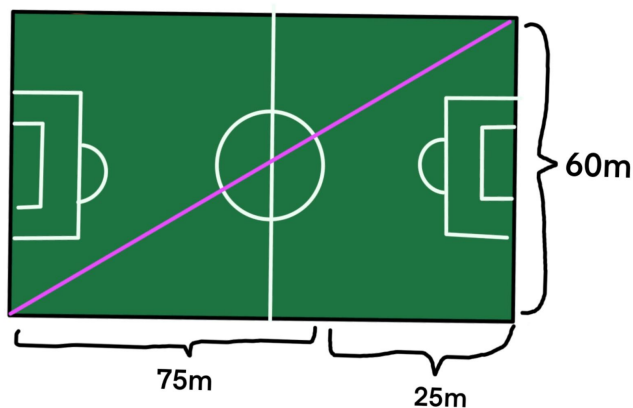
$$m = \sqrt{13448.68}$$

$$m = 115.96 \text{ meters}$$

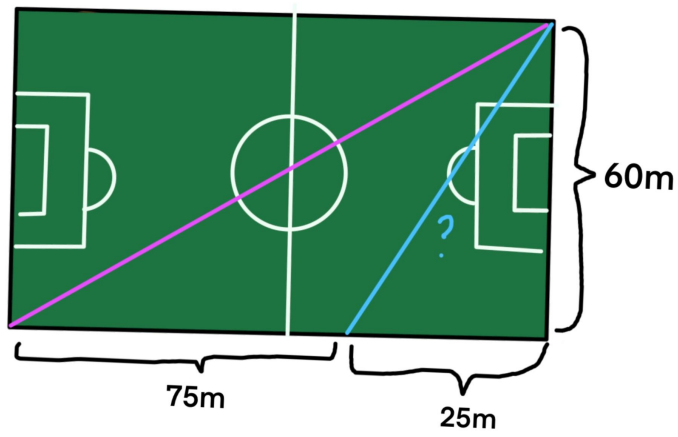
No, it's not a right triangle

Diagrams:

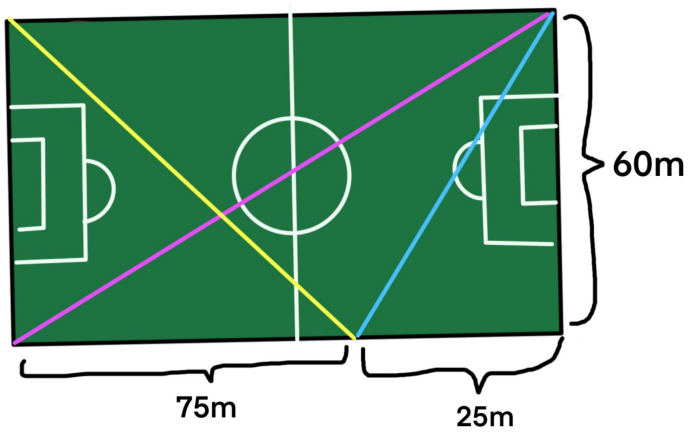
Triangle 1:



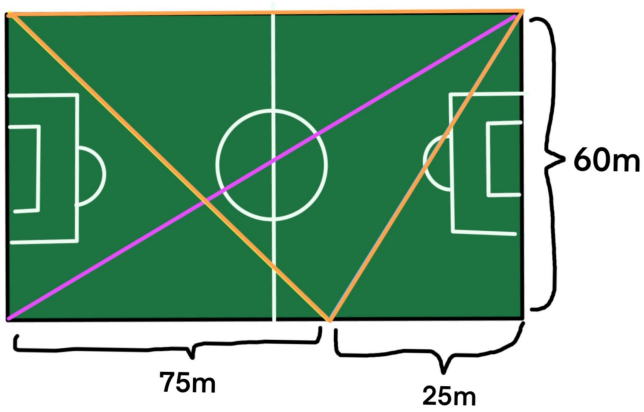
Triangle 2:



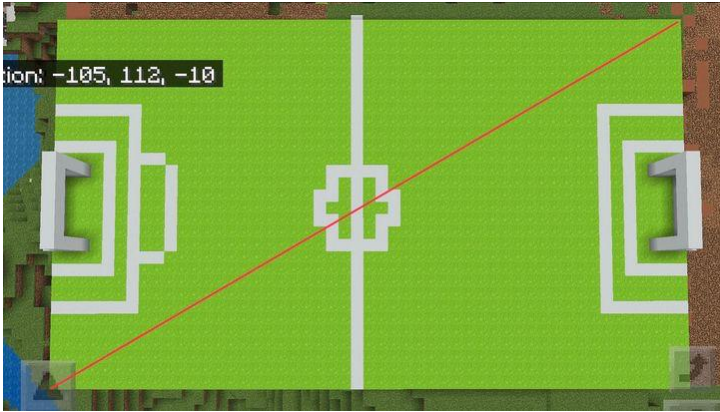
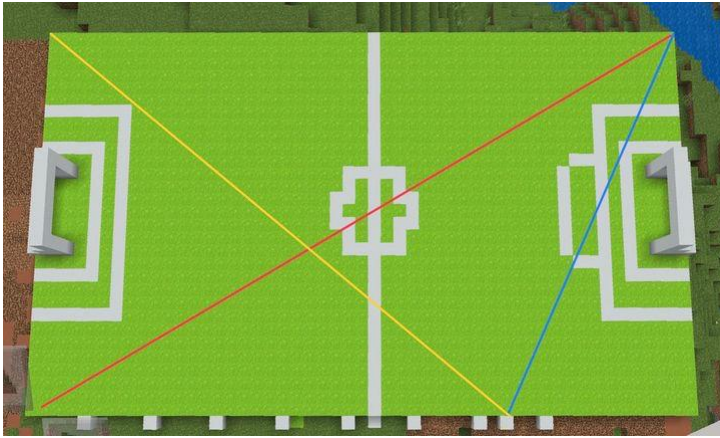
Triangle 3:

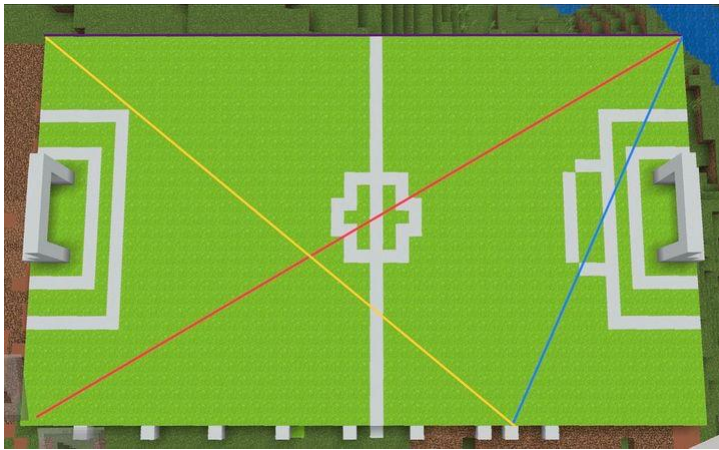
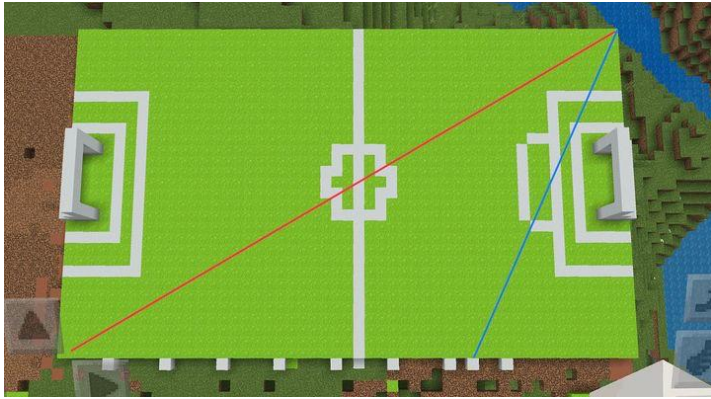


Triangle 4:



3D Model:





Reflection:

At the beginning of the project we were really stuck on how to create a realistic and a solvable problem. After looking for inspiration for a long time we looked at the field and decided to do it about that. We also took into account that in our daily lives we see kids playing in the field so it would be perfect for our problem. After reflecting about our problem, the models, and the project, we came to the conclusion that our problem makes sense and is coherent with our results and models. We also realized that our problem could actually happen in real life. Making this project helped us with problem solving and taught us how to use Pythagoras in our daily lives or to solve a problem.