MATH 1201 Unit 3 Discussion Post

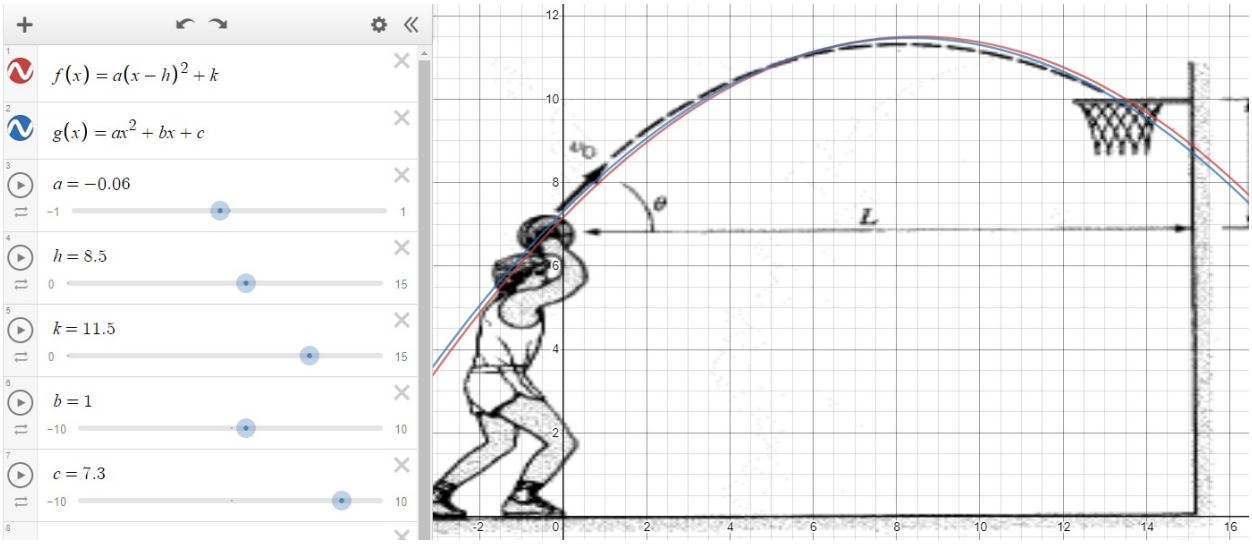
College Algebra (University of the People)

In basketball, the ball shots can be approximated to a parabola. What a player learns instinctively can be put in a mathematical formula for the perfect throw. In this particular example, the domain will be limited and the range with negative values can be disconsidered because there will be no negative distance from the hoops and the floor is the minimum limit.

The standard form of the second-degree equations will be used as follows:

$$f(x) = ax^2 + bx + c$$

The slope of the throw varies from 0 to 90º.
x is measure in time and a is always positive.
a affects the slope and will always be negative.
The vertex will be the highest point of the throw.
The ball will strike if the parabola crosses the coordinates of the hoop.



As can be seen in the graph, a is related to the slope of the throw, b is related to the velocity, and c the initial height. In this case, it resulted in an oversimplification because the velocity itself is related negatively to the acceleration of gravity and there is air drag to be considered. Also, the slope has to be calculated through Pythagoras. Nonetheless, it gives a general idea of the mathematics involved in the simple act of shooting a hoop.

Reference

Desmos activities retrieved from https://teacher.desmos.com/activitybuilder/custom/5d94d8c0243f2960681f7b32?lang=pt-BR#preview/9318abf4-d038-4950-888f-85b0018a4710