

Advanced Algebra & Trigonometry Group Problem
Chapters 1 & 2

Imagine that a rectangular coordinate system is superimposed over the area in the Caribbean where the *Atlantis Adventures* tour submarine is traveling near Saint Croix, Virgin Islands. The coordinate grid is square and has a scale of 1 mile.



In this system, a sonar buoy is located in the fourth quadrant. The buoy can be located by tracing global positioning system data from previous tours. The buoy is located at the intersection of the following lines:

$$f(x) = 0.4x - 1.9$$
$$g(x) = -0.9x - 0.6$$

Use this information to find the location of the buoy.

On one particular trip, the tour submarine travels along a portion of the path of the function $h(x) = x^2 - 3$. Write a function to express *the distance* between the submarine and the buoy as a function of the submarine's x -coordinate.

The submarine transmits data that is received by the buoy and stored for safety purposes. The signal strength of the transmission is strongest when the submarine is closest to the buoy. Determine the location of the submarine where the signal strength of the transmission is strongest.

When the submarine is more than 5 miles from the buoy, interference can disrupt the transmission of data from the submarine to the buoy. Within what range of x -coordinates can the submarine travel to avoid any transmission disruptions? Express your solution as an interval.

Your group will work together to solve this problem and present your solutions to me in a neat and clear manner, with graphs, algebraic methods, tables, and other work as necessary. Try to make your 'presentation' of your solution stand out from the rest by being creative.

I expect that your group should use technology appropriately to help solve these problems. However, be sure to include explanations of your process even as you utilize any technology.

This group problem is worth 50 points and is due _____.
No late solutions will be accepted, so plan accordingly to use class time wisely and delegate responsibilities!