

The Message

Pay special attention to completeness and clarity as you write the solutions to the following two problems.

Dr. Zee, the illustrious scientist, and his talented and faithful assistant had just completed the construction of a two-dimensional vehicle, and they were now exploring Flatland¹.

“Of course we need to send a message to the square,” lamented Dr. Zee. “But the swivel mechanism on our antenna is stuck, and the antenna is pointed straight ahead. We cannot turn it at all.”

“What course have you plotted, sir?” asked his assistant.

“Using the gravitational pull of a black point,” continued Dr. Zee, “we are traveling from left to right along the parabolic curve given by the equation $y = x^2 - 5x + 6$, and the square’s house is located at the point $(0, 4)$. Perhaps we could send the message at the instant that our ship is pointed exactly toward the point $(0, 4)$. But how can we know when that will happen?”

“Well,” suggested his talented assistant, “Perhaps we could use a der...”

“I’ve got it!” interrupted Dr. Zee. “We’ll calculate the derivative of the function $f(x) = x^2 - 5x + 6$. We know that ...

Finally, Dr. Zee concluded his calculations, and the two explorers knew exactly when to send the message.

“Brilliant, sir!” shouted his assistant.

1. Find the location at which the ship will point exactly in the direction of the square’s house.
2. Draw the graph of Dr. Zee’s path and show the location of the square’s house. Also show the point on the graph from where the message to the square should be sent.

Copyright ©, 2001 by Kenneth L. Wiggins This material may be distributed only subject to the terms and conditions set forth in the Open Publication License, v1.0 or later (the latest version is presently available at <http://www.opencontent.org/openpub>).

¹Flatland, by Edwin Abbott