

Project 1.1: The Routing Problem of Best Paper Products

Use a graphing calculator, MATLAB, or other software package, as indicated by your instructor, to perform the instructions in Exercises 4 through 10 for the problem of Best Paper Products described in Section 1.4.1 with these locations for the six customers:

Customer number	1	2	3	4	5	6
East-West distance	1.2	2.2	4.1	3.5	4.0	1.0
North-South distance	2.8	2.5	3.0	1.4	1.0	2.5

Whenever possible, use vector operations available on your system. Write the answer and the sequence of operations you performed.

4. Store the six East-West distances of the customers in a vector x and the six North-South distances in a vector y .
5.
 - (a) Find the straight-line distance from the warehouse to each of the customers. Use a vector dot product to find the sum of these distances.
 - (b) Suppose the truck driver averages 30 miles per hour. For each customer, determine how long it would take (to the nearest minute) to drive from the warehouse to that one customer and return to the warehouse. Use a vector dot product to find the sum of these individual driving times.
6. Repeat the previous exercise assuming a rectangular road system.
7.
 - (a) For each customer, find the angle, in radians between 0 and 2π , through which a horizontal line must be rotated in the counterclockwise direction until passing through the location of that customer.
 - (b) Express the angles in part (a) in degrees between 0 and 360.
8. Write instructions that use the vector of angles obtained in the previous exercise to create a vector of the locations of the customers in order of increasing angle. (Note: The instructions you use depend on the specific form of technology you are working with. If you are unable to write such instructions, then create the desired vector of locations manually.)
9. Use your technology to draw a graph indicating the routing of the truck from the warehouse to the six customers in the order obtained in the previous exercise.
10. What is the total straight-line distance the truck travels in visiting the customers in the order determined in Exercise 8?