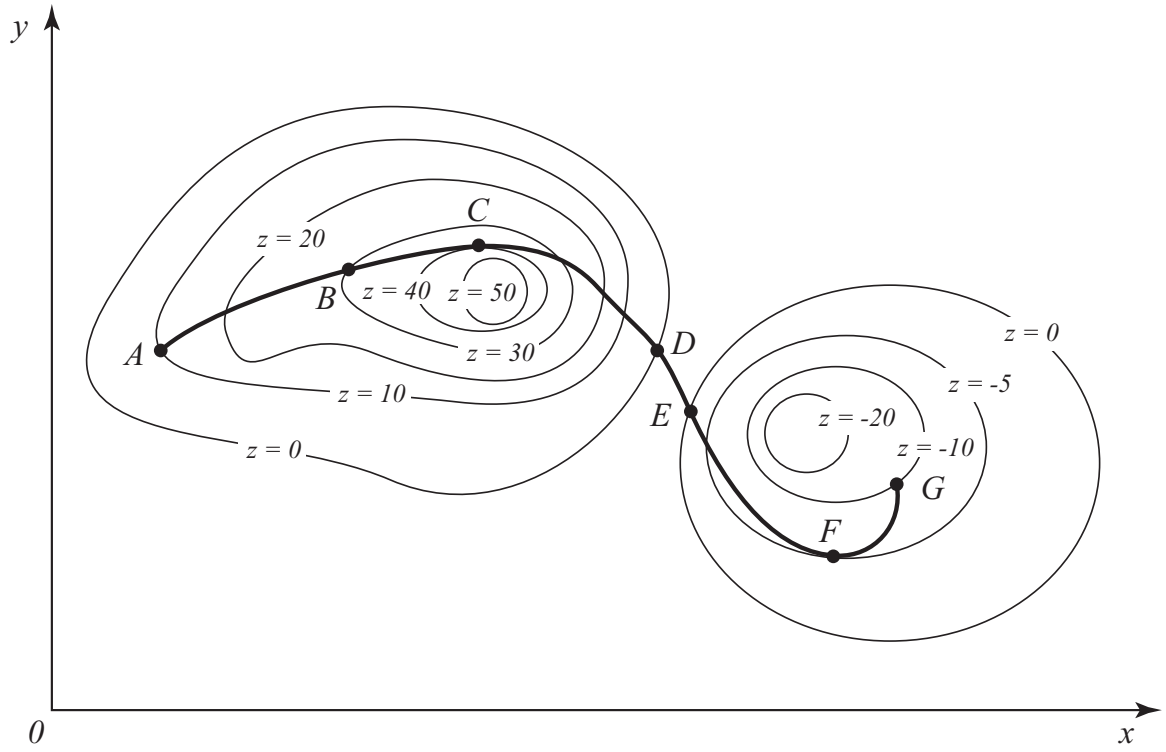
Math 10360 – Hiking Trail and Elevation

Complete This Before You Start Lagrange Multipliers



1. The graph above is called a contour map and is commonly used in (flat) maps to indicate the elevation of a terrain above sea level. Sea level is indicated by $z = 0$. The largest closed curve containing point D is at sea level. That is if you are walking along this closed curve containing point D, you will always be at sea level.

Image you are hiking on the **directed** path $ABCDEFG$ as indicated by the thicker curve (in bold). Inferring from the contour concept described above, answer the following questions about your hiking path. You should assume that all elevations and distances are in meters. Also you should assume that the up and down trends are as defined by the heights of the contours, for example you are always coming down on CD.

(a) List all the points on at which you are at sea level.

(b) What is your elevation when you are at point A on the map? Give units to your answer.

(c) Which part of your journey are you ascending? Use the known points $A, B, C, ...G$ to describe your answer.

Still assuming that the up and down trends are as defined by the heights of the contours, for example you coming down on DEF.

(d) Where on the path are you at the highest point? What is your elevation there above sea level?

(e) Where on the path are you at the lowest point? What is your position against sea level?

(f) What can you say about the path and the contour lines at the highest point? What about at the lowest point?