

Answer to Question #74724, Math / Calculus

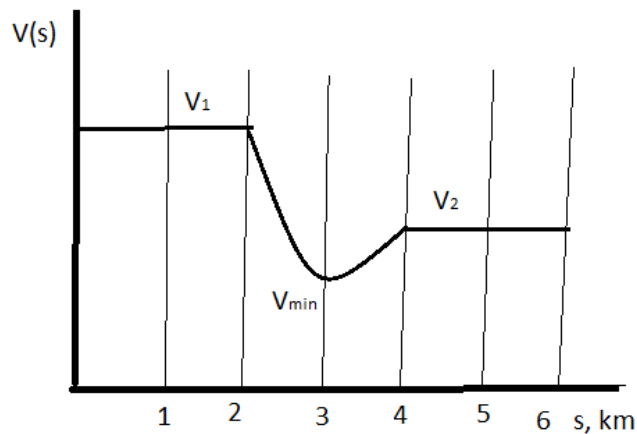
A jogger runs from her home to a point A, which is 6 km away. For these 6 km, she begins by running at a constant speed till she reaches a hilly portion 2 km from her home. Here her speed slows down while she runs up the hill, which is a 1 km run. Then she speeds up while running down the hill. The last 2 km of the run are again at constant speed. Draw a graph to show the jogger's speed as a function of the distance from her home. Also find the range of this function.

Solution.

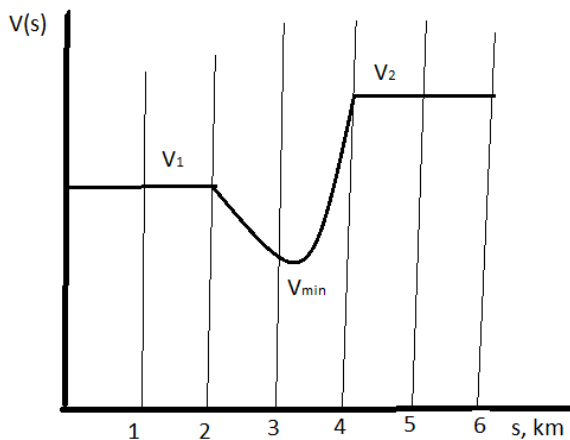
Let V_1 is jogger speed at the distance from home to the hill, V_2 is jogger speed at the distance from the hill to the point A, V_{min} is jogger speed at the peak of the hill.

Then we have two cases.

The first case $V_1 > V_2$:



The second case $V_1 < V_2$:



The range of $V(s)$: $V_{min} \leq V(s) \leq \max(V_1, V_2)$

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