

Answer on Question #73657 – Math – Calculus

Question

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

The graph of the jogger's speed is shown on the Figure 1.

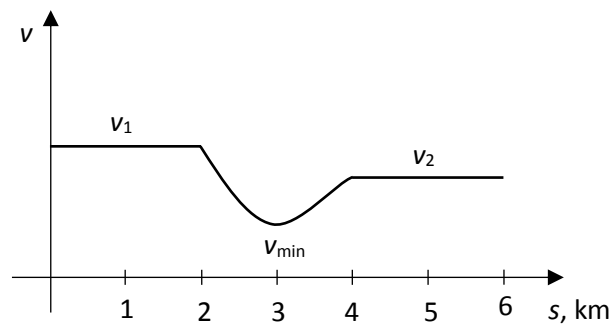


FIGURE 1

As we can see the initial jogger's speed is v_1 is constant for the first 2 km of the distance. The next 1 km the speed decreases to its minimal value v_{\min} . Then the speed increases up to v_2 and stay constant for the last 2 km of distance. Suppose that v_2 is less than v_1 .

The Figure 1 shows that the values of jogger's speed function are between v_{\min} and v_1 . So, the range of this function is $[v_{\min}, v_1]$.