

Intellectual Need Task for Definite Integrals

The Opportunity rover landed on Mars in 2004 and has been actively exploring the planet ever since. It is powered by solar cells. As the rover travels across the Martian surface, it kicks up dust, which accumulates on its solar cells.

Once the solar panels have accumulated 200 milligrams of dust, they'll stop providing enough power for the rover to move.

The rover is following a 100-km path.

- p is the rover's position along the path (km)
- $R(p)$ is the rate of dust accumulation (mg/km) at position p
- $R(p) = 6 \left(\frac{p}{50} + 1 \right)^{-2}$

Based on the information above, will the rover be able to travel 100 kilometers before its solar panels stop working?