

- 8 Fig. 8.1 shows the cross-section of a straight driveway 4 m wide made from tarmac.

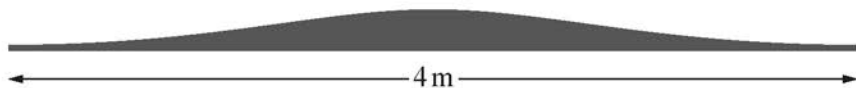


Fig. 8.1

The height h m of the cross-section at a displacement x m from the middle is modelled by $h = \frac{0.2}{1+x^2}$ for $-2 \leq x \leq 2$.

A lower bound of 0.3615 m^2 is found for the area of the cross-section using rectangles as shown in Fig. 8.2.

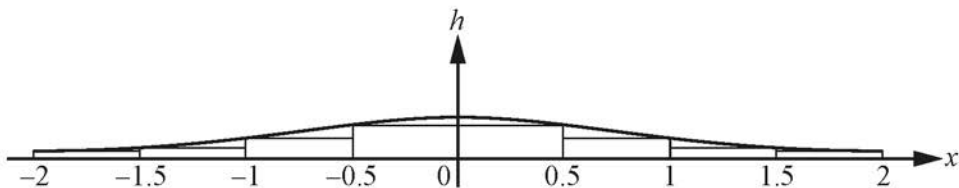


Fig. 8.2

- (a) Use a similar method to find an upper bound for the area of the cross-section. [3]
- (b) Use the trapezium rule with 4 strips to estimate $\int_0^2 \frac{0.2}{1+x^2} dx$. [2]
- (c) The driveway is 10 m long. Use your answer in part (b) to find an estimate of the volume of tarmac needed to make the driveway. [2]