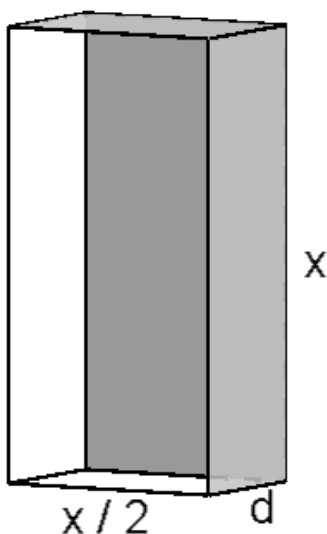


Please do not write on the subject, and do not forget to hand it back at the end.

FUNCTIONS

Kate is building a bookcase, with a closed back and an open front.

She wants her bookcase to be twice as high as it is wide, as shown below:



(x , $x/2$ and d are in m)

She uses a total of 8 m^2 of wood (not including the shelves).

The answers will be given respectively to the nearest cm^3 and the nearest mm.

- 1) Find the depth d of the bookcase in terms of the height x .
- 2) Show that the volume of the bookcase is given by: $V(x) = \frac{4}{3}x - \frac{x^3}{12}$
- 3) Kate wants the volume of the bookcase to be maximum: find this maximum value, and the corresponding measures for the bookcase.

NB: “shelves” means “étagères”.