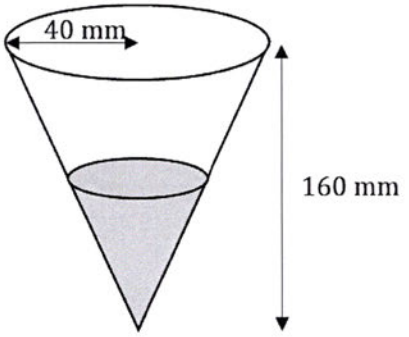
1



The diagram shows an ice cream cone with a height of 160 mm and radius of 40 mm.

The hollow cone, which is initially empty, is placed centrally under the ice cream machine.

The ice cream flows at a constant rate of k mm^3s^{-1}.

The rate at which the height of the ice cream is rising 10 seconds after it was placed under the machine is $\frac{1}{2}$ mms^{-1}.

Determine the exact value of k.

[12 marks]