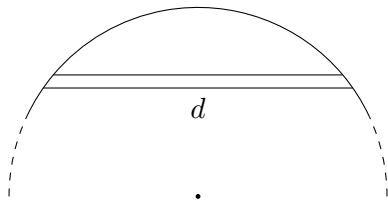


13. **Earth tunnel** \*\*

A tunnel is drilled through the Earth between two points on its surface, a straight-line distance  $d$  apart. How long does it take for an object to fall through the hole and reach the other side? How fast it is traveling when it arrives?



14. **Falling chain** \*\*

A chain of mass  $M$  and length  $L$  is suspended vertically with its lower end touching a scale. The chain is released and falls onto the scale. What is the reading on the scale when a length  $x$  of the chain has fallen?

15. **Newton's bucket** \*\*

A bucket of water spins at a constant angular velocity about its symmetry axis. What is the shape of the water's surface?

