

4. At time $t = 0$, a small stone is thrown vertically upwards from a point A,

- the point A is 19.6 m above horizontal ground
- the initial speed of the stone is 14.7 m s^{-1}
- the stone is modelled as a particle moving freely under gravity

Using the model,

(a) find the time from when the stone leaves A to when the stone first comes to instantaneous rest,

(2)

(b) find the total time from when the stone leaves A to when the stone first hits the ground.

(3)

Two possible refinements of the model are

- to include air resistance
- to use a more accurate value for g

(c) State **one other** possible refinement of the model that would make it more realistic.

(1)