13   A ball falls freely towards the Earth.

The ball passes through two different fixed points M and N before reaching the Earth's surface.

At M the ball has velocity $u \, \text{m s}^{-1}$
At N the ball has velocity $3u \, \text{m s}^{-1}$

It can be assumed that:
- the motion is due to gravitational force only
- the acceleration due to gravity remains constant throughout.

13 (a)   Show that the time taken for the ball to travel from M to N is $\dfrac{2u}{g}$ seconds.

[2 marks]

13 (b)   Point M is h metres above the Earth.

Show that $h > \dfrac{4u^2}{g}$

Fully justify your answer.

[3 marks]