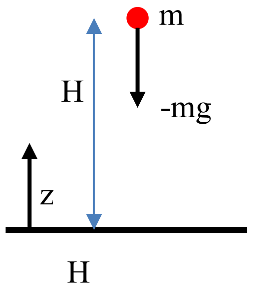
Did you start with a sketch?!



Gravity is a conservative force => a potential energy exists
$\vec{F} = -mg\,\hat{z} \rightarrow V - -\int_0^z -mgdz' = mgz$

Energy conservation: during the motion
$\frac{1}{2}mv^2 + mgz = const = mgH$
From this we find that the velocity upon impact with the ground (z=0) is $\frac{1}{2}mv^2 = mgH \rightarrow v = \pm\sqrt{2gH}$ The minus sign is the one we need as the particle moves in the negative z-direction.
Note: dimensions are correct.

Take time derivative:

$$\frac{1}{2}m2v\frac{dv}{dt} + \mathrm{mg}\frac{dz}{dt} = 0 \rightarrow m\frac{dv}{dt} = -mg$$

Indeed we get N2 back for this situation.

Solving is straight forward: $\frac{dv}{dt} = -g \rightarrow v = -gt + C$
Initial condition: $t = 0 \rightarrow v = 0 \Rightarrow C = 0 \rightarrow v = -gt$
Since we already the velocity upon impacting the ground, we don't need to solve the trajectory to find the time when the particle hits the ground:
$v(t^*) = -gt^* = -\sqrt{2gH} \rightarrow t^* = \sqrt{\frac{2H}{g}}$

Check:

- Dimensions: ok
- the higher H the longer it takes -> ok
- no gravity: $t^* \rightarrow \infty$: ok