

Question 1. *A golfer is practising on a range with an elevated tee 4.9 m above the ground strikes the ball so that it leaves the club with a horizontal velocity of 20 m s^{-1} . What is the speed of the ball 0.80 s after it leaves the golf club?*

Solution. Consider standard coordinate plane xOy (see https://en.wikipedia.org/wiki/Projectile_motion#Velocity). We have next system:

$$\begin{cases} v_x = v_0 = 20 \text{ m s}^{-1}, \\ v_y = -gt = -9.8 \text{ m s}^{-2} \cdot 0.8 \text{ s} \end{cases} \Rightarrow v = \sqrt{v_x^2 + v_y^2} = \sqrt{400 + 61.4656} = \sqrt{461.4656} \approx 21.482.$$

□