66. (a) The ball must increase in height by $\Delta y = 0.193$ m and cover a horizontal distance $\Delta x = 0.910$ m during a very short time $t_0 = 1.65 \times 10^{-2}$ s. The statement that the "initial curvature of the ball's path can be neglected" is essentially the same as saying the average velocity for $0 \le t \le t_0$ may be taken equal to the instantaneous initial velocity $\vec{v}_0$. Thus, using Eq. 4-8 to figure its two components, we have

$$\tan\theta_0 = \frac{v_{0y}}{v_{0x}} = \frac{\frac{\Delta y}{t_0}}{\frac{\Delta x}{t_0}} = \frac{\Delta y}{\Delta x}$$

so that $\theta_0 = \tan^{-1}(0.193/0.910) = 12°$.

(b) The magnitude of $\vec{v}_0$ is

$$\sqrt{v_{0x}^2 + v_{0y}^2} = \sqrt{\left(\frac{\Delta x}{t_0}\right)^2 + \left(\frac{\Delta y}{t_0}\right)^2} = \frac{\sqrt{\Delta x^2 + \Delta y^2}}{t_0}$$

which yields $v_0 = 56.4$ m/s.

(c) The range is given by Eq. 4-26:

$$R = \frac{v_0^2}{g}\sin 2\theta_0 = 132 \text{ m} .$$

(d) Partly because of its dimpled surface (but other air-flow related effects are important here) the golf ball travels farther than one would expect based on the simple projectile-motion analysis done here.