2D motion in vector notations and plots

An arrow is launched horizontally from a $H = 20\,m$ cliff with initial speed $V_o = 20\,m/s$.

1. write down the position vector

   $$\vec{r}(t) = (x(t),\, y(t)))$$

   specifying explicitly $x(t)$ and $y(t)$ for selected initial conditions

2. Calculate several pairs of numbers $x(t), y(t)$ for $0 < t \leq 2$ (you can use $g \approx 10\,m/s^2$ at this stage) and plot the trajectory on the graph below.

3. Identify the location of the arrow at $t = 1\,s$

4. find the vertical component of the velocity and the angle at which the arrow hits the ground; compare to the plot

5. The same if $V_o = 10\,m/s$; plot on the same graph