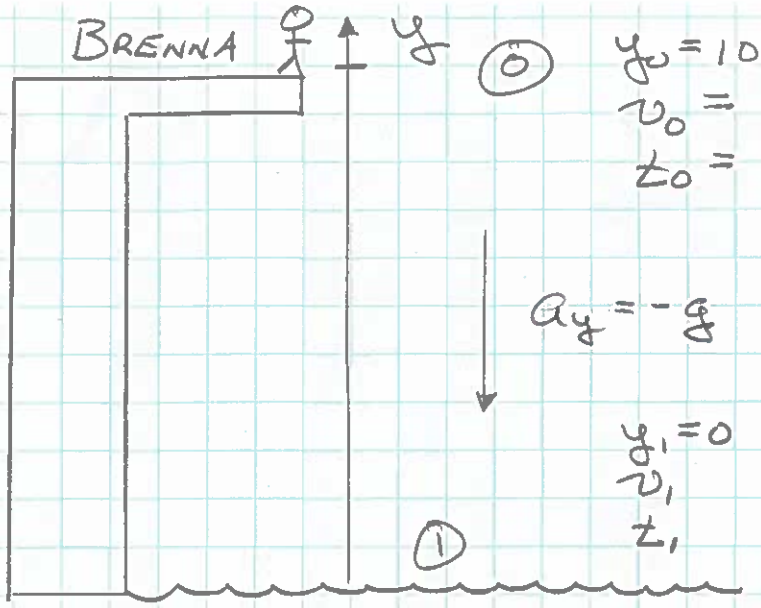

b.) find time of fall, t_1:

$$y_1 = y_0 + v_0 \Delta t + \frac{1}{2} a_y \Delta t^2 \qquad \Delta t = t_1 - t_0$$

$$0 = y_0 - \frac{1}{2} g t_1^2$$

$$\text{So, } t_1 = \sqrt{\frac{2y_0}{g}} = \underline{1.428\ s}$$

c.) find v_1:

$$v_1 = v_0 + a_y \Delta t$$

$$= -g t_1 \implies v_1 = -14.0\ m/s$$

NOTE: speed = 14 m/s

Or:

$$v_1^2 = v_0^2 + 2 a_y \Delta y \qquad \Delta y = y_1 - y_0$$

$$v_1^2 = 2(-g)(-y_0)$$

$$v_1 = \pm\sqrt{2 g y_0} = -\underline{14.0\ m/s}$$

d.) what is this in mph?

$$v_1 = 14.0\ m/s \left(\frac{1\ mph}{.447\ m/s} \right) = \underline{31.3\ mph}\ !$$