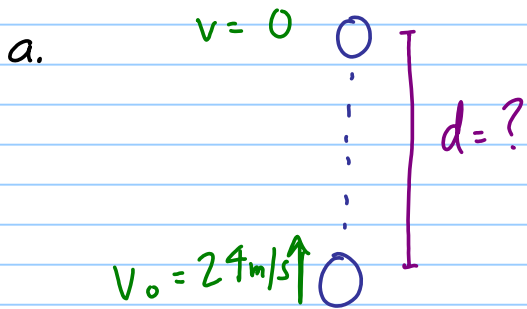


A soccer ball is kicked straight up in the air at 24 m/s.

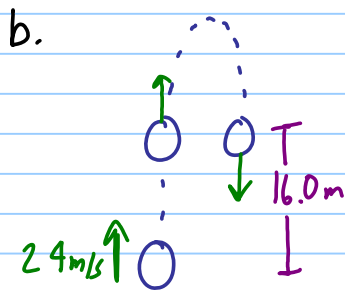
- a. What is the maximum height reached by the ball?
- b. What are the velocities when the ball's displacement is 16.0 m ?



$$\begin{aligned}
 v &= 0 \\
 v_0 &= 24 \text{ m/s} \\
 a &= -9.8 \text{ m/s}^2 \\
 d &= ? \\
 t &=
 \end{aligned}$$

$$v^2 = v_0^2 + 2ad \quad \checkmark$$

$$\begin{aligned}
 d &= \frac{v^2 - v_0^2}{2a} = \frac{0^2 - (24)^2}{2(-9.8)} \\
 &= \boxed{29.4 \text{ m}} \quad \checkmark
 \end{aligned}$$



$$\begin{aligned}
 v &= ? \\
 v_0 &= 24 \text{ m/s} \\
 a &= -9.8 \text{ m/s}^2 \\
 d &= 16.0 \text{ m} \\
 t &=
 \end{aligned}$$

$$v^2 = v_0^2 + 2ad \quad \checkmark$$

$$\begin{aligned}
 v &= \pm \sqrt{v_0^2 + 2ad} \\
 &= \pm \sqrt{24^2 + 2(-9.8)(16.0)}
 \end{aligned}$$

$$= \pm 16.2 \text{ m/s}$$

up and down