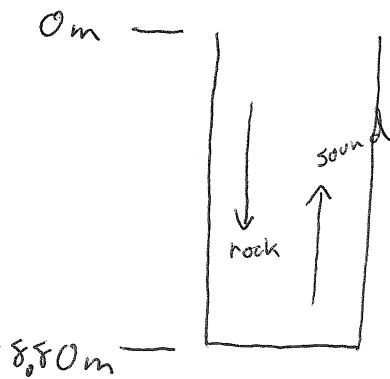


A rock is thrown downward into a well that is 8.80 m deep. If the splash is heard 1.20 s later, what was the initial speed of the rock?



$$t_{\text{rock}} + t_{\text{sound}} = t_{\text{report}} = 1.20 \text{ s}$$

Sound

$$v_s = 343 \text{ m/s}$$

$$x_s = x_0 + v_s \Delta t_s$$

$$x_0 = -8.80 \text{ m}$$

$$x = 0 \text{ m}$$

$$0 = -8.80 \text{ m} + (343 \text{ m/s}) \Delta t_s$$

$$\Delta t_s = \underline{\underline{2.566 \text{ E-}2 \text{ s}}}$$

Rock

$$x = x_0 + v_0 \Delta t_r + \frac{1}{2} a \Delta t^2$$

$$x_0 = 0 \text{ m}$$

$$x = -8.80 \text{ m}$$

$$a = -9.81 \text{ m/s}^2$$

$$v_0 = ?$$

$$-8.80 \text{ m} = v_0 \Delta t_r + \frac{1}{2} (-9.81 \text{ m/s}^2) \Delta t^2$$

②

$$\Delta t_R = 1.20\text{s} - 2.566 \times 10^{-2}\text{s} = 1.174\text{s}$$

$$v_0 = \frac{-8.80\text{m} + 4.905\text{m/s}^2 (1.174\text{s})^2}{1.174\text{s}}$$

$$= \boxed{-1.73\text{ m/s}}$$