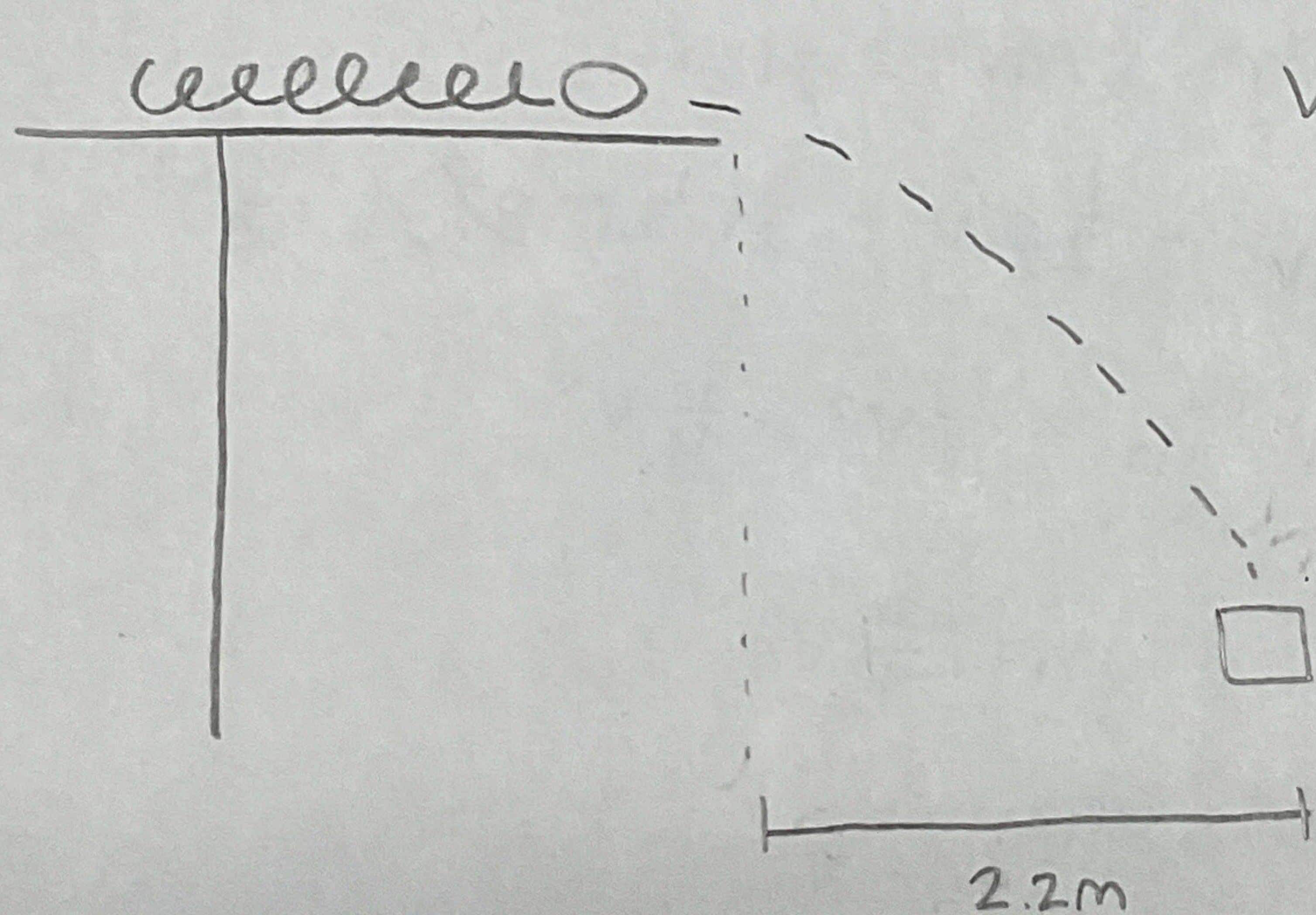


9)



$$V_f^2 - \cancel{V_i^2}^0 = 2g\Delta X$$

$$V_f^2 = 2g(2.2)$$

$$V_f = 6.633 \text{ m/s} \leftarrow \text{velocity needed}$$

$$V_f^2 - \cancel{V_i^2}^0 = 2g\Delta X$$

$$V_f^2 = 2g(1.93)$$

$$V_f = 6.212889827 \text{ m/s}$$

$$2.2 - 0.27 = 1.93 \text{ m travel } \Delta X = 0.011$$

$$w_0 = \sqrt{\frac{k}{m}}$$

$$mw^2 = k$$

$$\sqrt{\frac{43.9967}{mw^2}} = x$$

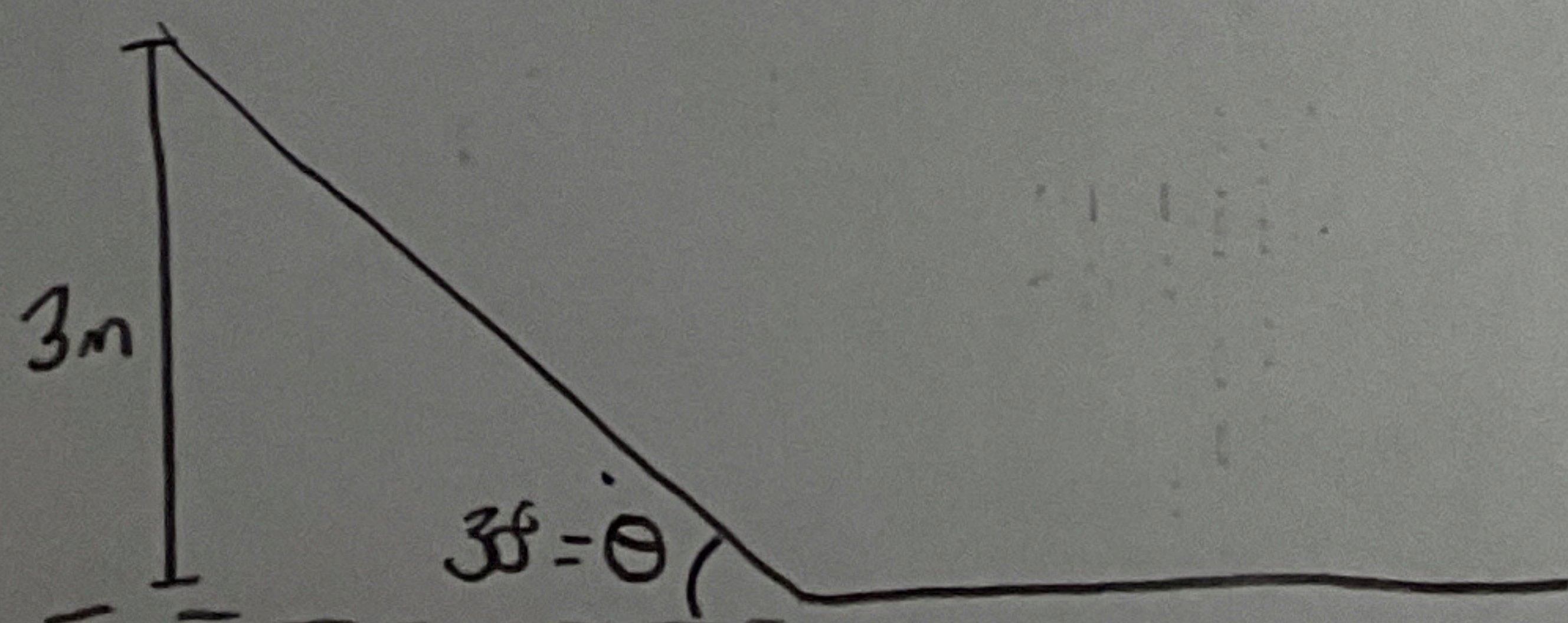
$$\sqrt{\frac{43.9967}{w^2}} = x$$

$$\frac{1}{2}mv^2 = \frac{1}{2}kx^2 \quad x$$

$$m(6.633)^2 = k(x^2)$$

$$\sqrt{\frac{m(43.9967)}{k}} = x$$

10)



$$ma = mgsin\theta - f$$

$$\alpha = \frac{a}{r}$$

$$\tau = fR = I\alpha = I\frac{a}{R}$$

$$f = I\frac{a}{R^2}$$

$$a = gsin\theta - \frac{1}{3}a$$

$$a = \frac{4}{3}gsin\theta$$

$$ma = mgsin\theta - \frac{1}{3}ma$$

3)