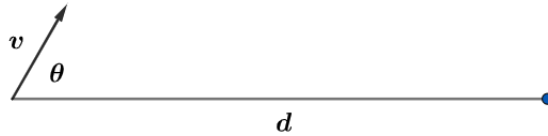


2023 F=ma Exam: Problem 10

Kevin S. Huang



Recall the range equation from kinematics,

$$d = \frac{v^2 \sin(2\theta)}{g}$$

In our case,

$$\theta = \frac{1}{2} \arcsin \left(\frac{gd}{v^2} \right) = \frac{1}{2} \arcsin \left(\frac{(10 \text{ m/s}^2)(100 \text{ m})}{(1000 \text{ m/s})^2} \right) = \frac{1}{2} \arcsin \left(\frac{1}{10} \right)$$

so the answer is D.