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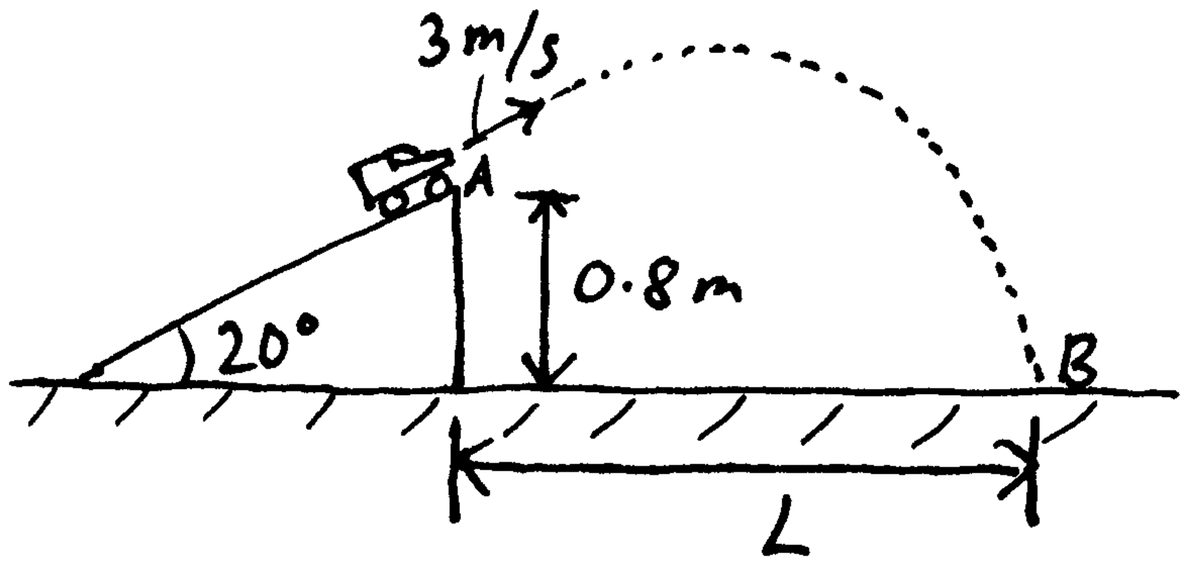
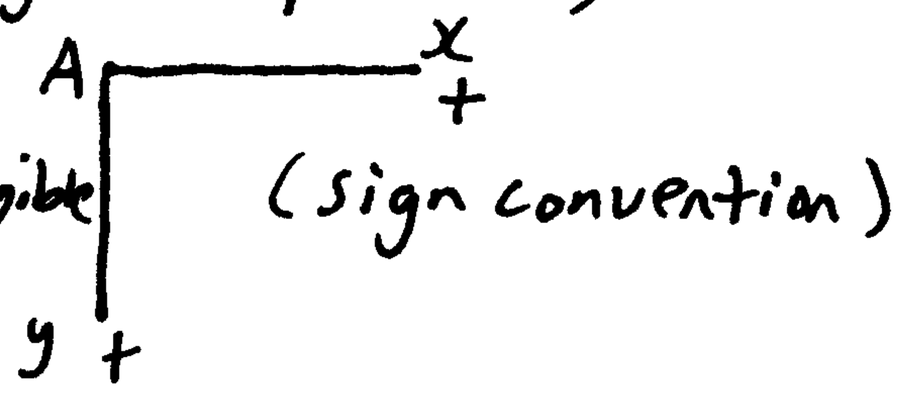
This is a problem involving projectile motion.



A remote controlled toy car is driven off the edge of a ramp, at point A, at a speed of 3 m/s. It lands at point B. If the edge of the ramp is at a height of 0.8 m, and it is inclined at 20° with the horizontal, what is the horizontal distance, L, between point A and point B?

Solution: Set up an xy coordinate frame with origin at point A, as shown.

Assumptions:
- Ignore air resistance → negligible
- Treat car as a particle



The equation for horizontal motion is:

$$d_x = (v_0 \cos 20°)\, t \quad (1)$$

$d_x = ?$ (horizontal displacement when car lands at point B)

$v_0 = 3\ m/s$ (magnitude of initial car velocity)

$t = ?$ (time it takes the car to fall to the ground)

The equation for vertical motion is:

$$d_y = (-v_0 \sin 20°)t + \frac{1}{2}gt^2 \quad (2)$$

$d_y = 0.8\,m$ (vertical displacement when car lands at point B)

$g = 9.8\ m/s^2$

From equation (1), $t = \dfrac{d_x}{v_0 \cos 20°} = \dfrac{d_x}{3 \cos 20°}$

Substitute this into equation (2):

$$d_y = 0.8 = -d_x \tan 20° + \frac{1}{2}(9.8)\left(\frac{d_x}{3 \cos 20°}\right)^2$$

Simplify: $0.6165\, d_x^2 - 0.364 d_x - 0.8 = 0$

This is a quadratic equation.
Solve for d_x.

$d_x = \underbrace{-0.88\,m}_{\text{not valid}}$ or $d_x = 1.47\ m$

Therefore, the horizontal distance, $L = 1.47$ m.
(answer)