

Answer on Question #42197, Physics, Mechanics | Kinematics | Dynamics

A bus is moving along a road at the rate of 2 m/s. In what direction should a stone be projected from it with a velocity of 12 m/s so that the resultant motion of the stone may be right angle to the motion of the bus?

Solution:

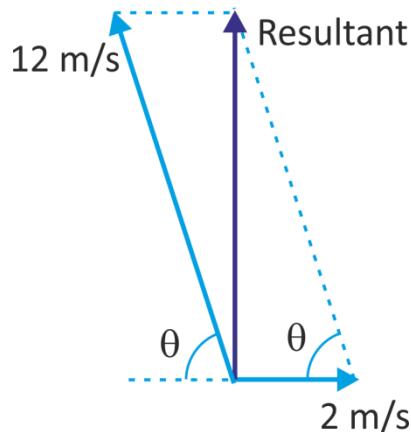
Given:

$$v_b = 2 \text{ m/s},$$

$$v_s = 12 \text{ m/s},$$

$$\theta = ?$$

The velocity diagram is



$$\cos \theta = \frac{v_b}{v_s} = \frac{2}{12} = \frac{1}{6}$$

$$\theta = \cos^{-1} \left(\frac{1}{6} \right) = 80.41^\circ$$

Answer. The stone must be thrown in the opposite direction at an angle 80.41° to the horizontal.