

Answer on Question #70657, Physics / Classical Mechanics

Question A bus is moving along a road at the rate 8m/s, In what direction should stone should be projected from it with a velocity of 12m/s, so that the resultant motion of the stone may be at right angle to the motion of the bus?

Solution So we have condition that component of stone's velocity that is parallel to velocity of bus must completely compensate it. Hence

$$12 \cdot \cos(\pi - \alpha) = 8$$

$$\alpha = \pi - \arccos 8/12 \approx 2.3 \text{ rad} \approx 131.78^\circ$$

So, the direction should be 131.78° relative to the direction of movement of bus.