Answer on Question ##69471 -Physics / Other

A car moves with a speed of $v_1 = 40$ km/h can be stopped by applying brakes in $S_1 = 4$ m. If the same car is moving with a speed of $v_2 = 80$ km/h, what is the minimum stopping distance assuming that the retardation is constant.

Solution

$$S = \frac{v_f^2 - v_i^2}{2a}$$

$$v_f = 0, \qquad a < 0$$

$$S_1 = \frac{v_{1i}^2}{2a};$$

$$S_2 = \frac{v_{2i}^2}{2a}$$

Thus:

$$\frac{S_2}{S_1} = \frac{v_{2i}^2}{v_{1i}^2}$$

$$S_2 = \frac{v_{2i}^2}{v_{1i}^2} \times S_1 = \left(\frac{80}{40}\right)^2 \times 4 = 16 \text{ m}.$$

Answers: $S_2 = 16$ m.