

The brochure advertising a sports car states that the car can be moving at 100.0 km/h, and stop in 37.19 meters. What is its average acceleration during a stop from that velocity? Express your answer in m/s². Consider the car's initial velocity to be a positive quantity.

Solution:

Let:

$$v = 100 \text{ km/h} = 27.78 \text{ m/s}$$

$$S = 37.19 \text{ m}$$

$$a - ?$$

$$v = at, S = \frac{1}{2}at^2 \Rightarrow t = \sqrt{\frac{2s}{a}}$$

$$v = \sqrt{2as}$$

$$a = \frac{v^2}{2s}$$

$$a = \frac{27.78^2}{2 \cdot 37.19} = 10.38 \text{ m/s}^2$$

Answer: 10.38 m/s²