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A steel sphere is dropped from rest vertically onto a horizontal metal plate. The sphere hits the plate with speed u , leaves it at speed v , and rebounds vertically to half of its original height. Ignore effects of air resistance.

Which expression gives the value of $\frac{v}{u}$?

A

$$\frac{1}{2^2}$$

B

$$\frac{1}{2}$$

C

$$\frac{1}{\sqrt{2}}$$

D

$$1 - \frac{1}{\sqrt{2}}$$