Answer on Question #70212-Physics-Other

A kangaroo can jump over an object 2.50 m high.

(a) Calculate its vertical speed when it leaves the ground.

(b) How long is it in the air?

Solution

(a) From the conservation of energy:

$$\frac{mv^2}{2} = mgh$$

$$v = \sqrt{2gh} = \sqrt{2(9.81)(2.50)} = 7.00\frac{m}{s}.$$

(b)

$$h = \frac{gt^2}{2}$$

$$t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2(2.50)}{(9.81)}} = 0.714\ s.$$

Answer: (a) 7.00 $\frac{m}{s}$; (b) 0.714 s.