Answer on Question #70575-Physics-Other

my problem is " a gray kangroo can bound across a flat stretchof ground with each jump carrying it 11 m from the take off point. if the kangaroo leaves the ground at a 20 degree angle, what is its takeoff speed?

I believe the formula is (11*9.8)/(sin2(20)) but I do not know how to get the answer and how to put sin2(20) in my calculator

Solution

Formula for the range of projectile is

$$x = \frac{v_0^2 \sin 2\theta}{g}$$

The initial speed is

$$v_0 = \sqrt{\frac{gx}{\sin 2\theta}} = \sqrt{\frac{(9.81)(11)}{\sin 2(20)}} = \sqrt{\frac{(9.8)(11)}{\sin 40}} = 13\frac{m}{s}.$$

You need to put $\sin 40$ in your calculator.

Answer: $13\frac{m}{s}$.