

A rocket is fired straight up in the air at 160m/s. How long has it been in the air when its velocity is 23 m/s downward?

Solution

The velocity of the rocket (upward is positive direction):

$$v = v_0 - gt,$$

where v_0 - initial velocity, g - an acceleration of gravity.

So we have

$$t = \frac{v - v_0}{g}$$

$$t = \frac{160 - (-23)}{9.8} = \frac{160 + 23}{9.8} = 18.7 \text{ s.}$$

Answer: 18.7 s.