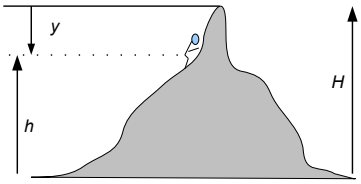
Chapter 7 Problem 15 [†]



Given
$m = 60\ kg$
$H = 1250\ m$
$E = -240\ kJ$

Solution
Find the altitude of the hiker.

Since the potential energy is measured relative to the peak of the mountain, the negative energy implies that the hiker is below the summit. Since gravitational potential energy near the earth's surface is given by $U = mgy$, then the distance below the peak is

$$y = \frac{U}{mg} = \frac{-240,000\ J}{(60\ kg)(9.8\ m/s^2)} = -408\ m$$

Since the altitude of the summit is $1250\ m$, then the altitude of the hiker is

$$h = H + y = 1250\ m - 408\ m = 842\ m$$

[†]Problem from Essential University Physics, Wolfson