1° Honors Physics - Kinematics 10-04-04

A rock is thrown up from the edge of a 275 m high cliff at 25.4 m/s. (a) What is its final velocity when it hits at the base of the cliff? (b) How long is it in the air? (A diagram will help.)

$\Delta y = -275\,m$

$V_{yi} = 25.4\,\frac{m}{s}$

$a = -9.8\,\frac{m}{s^2}$

$V_{yf} = \_\_\_\_\,\frac{m}{s}$

$t = \_\_\_\_\,s$

$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$

$V_{fy} = \sqrt{(25.4\,\frac{m}{s})^2 + 2(-9.8\,\frac{m}{s^2})(-275\,m)}$

a) $\boxed{V_{fy} = -77.7\,\frac{m}{s}}$

$V_{fy} = V_{iy} + at$

$t = \frac{V_{fy} - V_{iy}}{a}$

$= \frac{-77.7\,\frac{m}{s} - 25.4\,\frac{m}{s}}{-9.8\,\frac{m}{s^2}}$

b) $\boxed{t = 10.5\,s}$

1° Honors Physics - Kinematics 10-05-04

A rock is thrown down from the edge of a 165 m high cliff at 35.2 m/s. (a) What is its final velocity when it hits at the base of the cliff? (b) How long is it in the air? (A diagram will help.)

$\Delta y = -165\,m$

$V_{yi} = -35.2\,\frac{m}{s}$

$a = -9.8\,\frac{m}{s^2}$

$V_{yf} = \_\_\_\_\,\frac{m}{s}$

$t = \_\_\_\_\,s$

$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$

$V_{fy} = \sqrt{(35.2\,\frac{m}{s})^2 + 2(-9.8\,\frac{m}{s^2})(-165\,m)}$

a) $\boxed{V_{fy} = -66.9\,\frac{m}{s}}$

$V_{fy} = V_{iy} + at$

$t = \frac{V_{fy} - V_{iy}}{a}$

$= \frac{-66.9\,\frac{m}{s} - (-35.2\,\frac{m}{s})}{-9.8\,\frac{m}{s^2}}$

b) $\boxed{t = 3.23\,s}$