A stone is thrown vertically up and it returns to the thrower 3.2s later.

a) What is the stone's maximum height?

b) What is the initial velocity of the stone when released by the thrower?

a) maximum height is at moment of time $t = \frac{3.2s}{2} = 1.6\ s.$

Coordinate for uniformly accelerated motion equals:

$h = v_0 t - \frac{gt^2}{2}$

v_0 - initial velocity of the stone

g – gravitational acceleration

t – time

$h = v_0 t - \frac{gt^2}{2} = v_0 t - gt^2 + \frac{gt^2}{2} = (v_0 - gt)t + \frac{gt^2}{2}$

If t=1.6 s $v_0 - gt = v = 0$ - maximum height

$h = \frac{gt^2}{2} = 12.5\ m$

Answer: h=12.5 m

b) From first part:

$v_0 - gt = v$

If t=1.6 s $v = 0$

$v_0 - gt = 0$

$v_0 = gt = 9.8 * 1.6 = 15.7 \frac{m}{s}$

Answer: $v_0 = 15.7 \frac{m}{s}$