

Drop a stone ( $v_f = -120 \text{ ft/s}$ )

↑  
Final velocity (at impact)

Height of cliff?

$$a(t) = -32 \text{ ft/s}^2$$

$$a(t) = -32$$

$$v(t) = -32t + C$$

but  $v(0) = 0$  (stone is dropped)

$$\text{so } v(0) = -32(0) + C = 0 \Rightarrow C = 0$$

so  $v(t) = -32t$

We also know  $v_f = -120 \text{ ft/s}$

so we can get the time of flight

$$v(t_f) = -32t_f = -120$$

↑  
set

$$t_f = 3.75 \text{ sec}$$

$$s(t) = -32 \frac{t^2}{2} + d$$

$$s(t) = -16t^2 + d$$

Note: when  $t = 0$ ,  $s(0) = d$  ← height of cliff  
Solve for  $d$ !

$$s(3.75) = -16(3.75)^2 + d = 0$$

↑  
stone is on the ground

$$-16(3.75)^2 + d = 0$$

$$d = 225 \text{ ft}$$