

Deterministic Math Models (550.251)

Quiz 6

Name Solutions

A firecracker shot vertically upward from the ground has height in feet after t seconds of $h(t) = 192t - 16t^2$. Find (a) when it will hit the ground and (b) when it will reach its maximum height.

(a) The ground is $h = 0$

$$h(t) = 192t - 16t^2 = 0$$

$$16t(12 - t) = 0$$

$$t = 0 \text{ or } \boxed{t = 12 \text{ secs}} \text{ (since } t = 0 \text{ is start)}$$

(b) $h'(t) = 192 - 32t$

$$h'(t) = 0 \Rightarrow 192 = 32t \quad \boxed{t = 6 \text{ sec}}$$

max height occurs 6 sec after start.

Check we have a max!

$$h''(t) = -32 < 0 \text{ so } h \text{ is everywhere } \cap$$

Concave