

Fireworks Problem:

$$s = -16t^2 + 256t$$

$$s' = v = -32t + 256$$

*v = 0 @ max height for object to fall back down

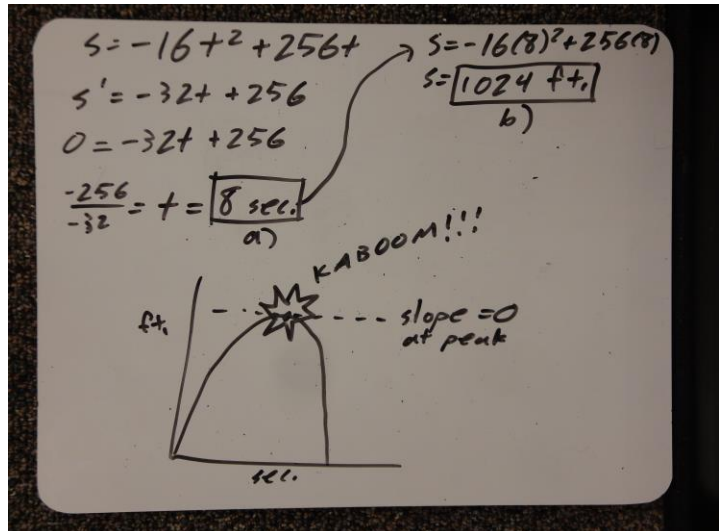
$$0 = -32t + 256$$

$$t = 8s$$

Max height = $s(8)$

$$= 1024m$$

ft



One note: Realize that the parabola shape is not a trajectory of the firework (but the graph does describe the height of the firework as a function of time).

Machine stopping at $t = 3$ seconds. The board below explains how to solve this problem (in an excellent way!).

a. $x'(t) = 2t - 8$

$$x'(2) = 2(2) - 8$$

$$= -4$$

b. $x(3) = 1$

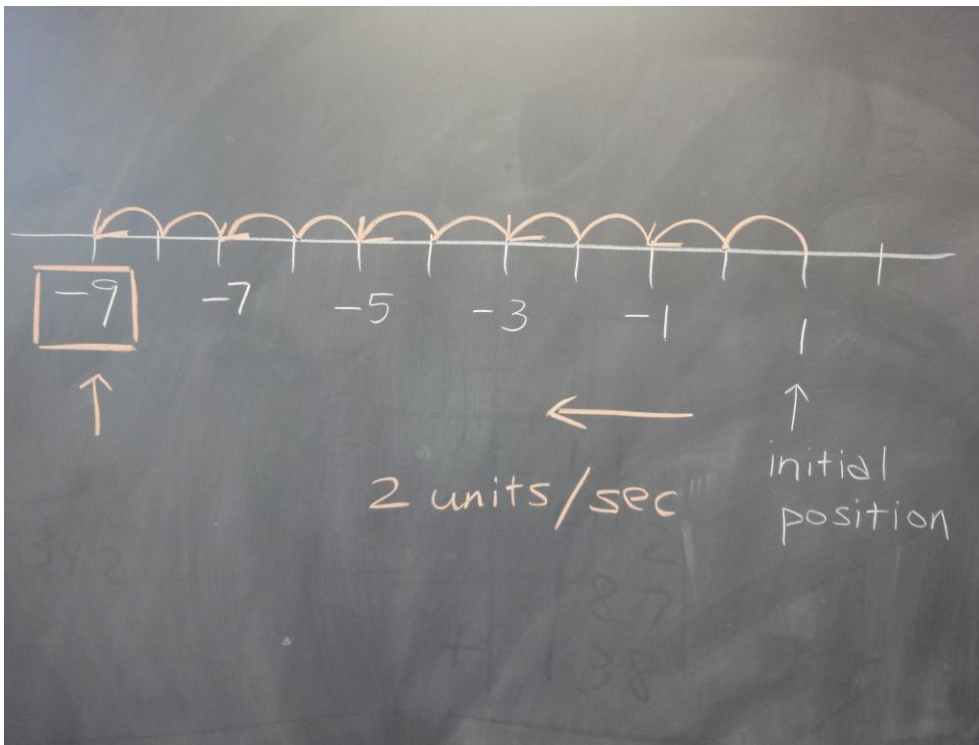
$$x'(3) = -2 \text{ units/Sec}$$

$$-2 \text{ u/s} \cdot 5s = -10 \text{ units moved}$$

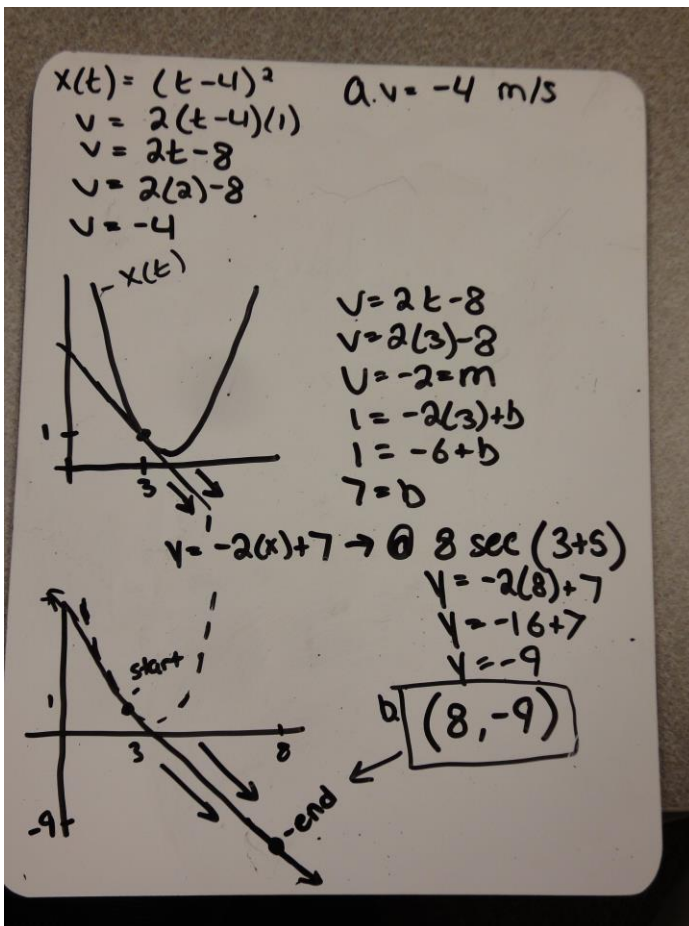
$$1 + (-10) = -9$$

After 5 sec of the machine off, the particle would be at $x = -9$. The position of the particle at 3 seconds would be 1 unit. The particles velocity is -2 u/s at 3 seconds. The particle continues at -2 u/s for 5 sec which means it moves -10 units. -10 units + 1 unit, the starting position, will put you at -9 units

You can also solve this visually with a number line:



Or geometrically:



Or with some physics:

