



$$v = v_0 + gt$$

$$v = 30 - 10t$$

$$x = x_0 + v_0 t + \frac{1}{2}gt^2$$

$$x = 200 + 30t - 5t^2$$

Si fem $x=0$ podem trobar l'instant quan toca terra.

$$0 = 200 + 30t - 5t^2$$

$$t = \frac{-30 \pm \sqrt{30^2 - 4(-5)(200)}}{2(-5)} = \frac{-30 \pm 70}{-10} = \begin{cases} -4s \\ \boxed{10s} \end{cases}$$

La velocitat final: $v = 30 - 10 \cdot 10 = -70 \text{ m/s}$

(b) Quan el mòbil es troba a $x=150\text{m}$

$$150 = 200 + 30t - 5t^2$$

$$0 = 50 + 30t - 5t^2$$

$$t = \frac{-30 \pm \sqrt{30^2 - 4(-5)(50)}}{2(-5)} = \frac{-30 \pm 43,6}{-10} = \begin{cases} -1,36s \\ \boxed{7,4s} \end{cases}$$

Els últims 50 metres tardarà un temps:

$$\Delta t = t(200\text{m}) - t(150\text{m}) = 10s - 7,4s = \boxed{2,6s}$$

Quan baixa amb velocitat 40 m/s busquem l'altura

$$\therefore v = -40 = 30 - 10t$$

$$10t = 30 + 40 = 70$$

$$t = 7s$$

$$\therefore x = 200 + 30t - 5t^2 = 200 + 30 \cdot 7 - 5 \cdot 7^2 = \boxed{214 \text{ m}}$$