

1. $h(t) = -16t^2 + 32t$. Find t at the vertex.

$$t = -b/(2a) = -32/(-32)$$

Answer: $t = 1$ s

2. Same rocket: what is the max height?

$$h(1) = -16 + 32$$

Answer: 16 ft

3. $h(t) = -16t^2 + 80t$: time at max? (Trainer echo - Jan 2026 Q31!)

$$t = -80/(-32)$$

Answer: $t = 2.5$ s

4. Same: max height?

$$h(2.5) = -16(6.25) + 200 = -100 + 200$$

Answer: 100 ft

5. When does $h(t) = -16t^2 + 80t$ hit the ground ($h = 0$)?

$$-16t(t - 5) = 0$$

Answer: $t = 5$ s

6. A ball: $h(t) = -16t^2 + 48t + 4$. Height at $t = 1$?

$$-16 + 48 + 4$$

Answer: 36 ft

7. $h(t) = -16t^2 + 64t$. Max height and when?

$$t = 64/32 = 2; h(2) = -64 + 128$$

Answer: 64 ft at $t = 2$ s

8. From what height was $h(t) = -16t^2 + 80t + 6$ launched?

$$h(0) = 6$$

Answer: 6 ft

9. A rocket $h(t) = -16t^2 + 96t$. Find max height, time to it, and total air time. ★ challenge

$$t = 3; h(3) = -144 + 288 = 144$$

$$\text{Ground: } -16t(t-6)=0$$

Answer: 144 ft at $t=3$; lands $t=6$

10. Two balls: A is $h = -16t^2 + 64t$, B is $h = -16t^2 + 48t + 20$. Which reaches the higher peak? ★ challenge

$$\text{A peak: } t=2, h=64$$

$$\text{B peak: } t=1.5, h=-36+72+20=56$$

Answer: A (64 ft > 56 ft)