Answer key: How to Find Change in Velocity: Why It's 7, Not 3

Physics with Tiaotiao 跳跳 · Kinematics · High School Physics
Study sheet for the video "How to Find Change in Velocity": answer key

Answers and explanations

Tap a blue time to jump to the part of the video that explains the question.

1. (a) +70 km/h, (b) −60 km/h, (c) −60 km/h. Right is positive.
(a) v_0 = +30, v_t = +100, so Δv = 100 − 30 = 70 km/h. (b) v_0 = +80, v_t = +20, so Δv = 20 − 80 = −60 km/h.
(c) v_0 = +40, v_t = −20, so Δv = −20 − 40 = −60 km/h.

Same Δv as (b), different motion. A + sign can be dropped; a − sign cannot.

▶ **Watch 31:30, Example 1**

2. ✗ ✓ ✗ ✗ ✗ (items 1 to 5).
(1) ✗: change in velocity is also a vector, so it has a direction. (2) ✓: the velocity points right, and braking gives a Δv that points left. (3) ✗: a bullet train is fast but moves at constant velocity, so Δv = 0. (4) ✗: Δv does not have to point the way the final velocity points. For 4 m/s to 3 m/s rightward, Δv = −1 m/s points left. (5) ✗: going from 0 to 5 m/s gives a bigger Δv than going from 100 to 99 m/s, but the velocity is far smaller.

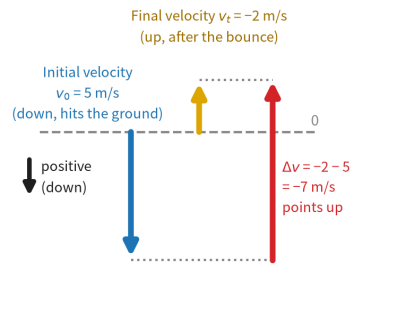
Δv is set by outside factors: think brake and gas pedal.

▶ **Watch 34:15, Example 2**

3. A and C. A is correct: Δv is a vector, and on a line the sign shows direction. C is correct: a final velocity to the right can come with a Δv to the left, for example 3 m/s right to 1 m/s right. B is wrong: Δv does not depend on the velocity alone. D is wrong: Δv is how much the velocity changes. How fast it changes is acceleration, next lesson.

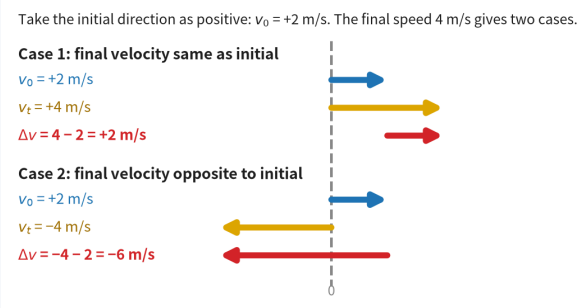
▶ **Watch 36:08, Example 3**

4. A and D. Take down as positive. v_0 = +5 m/s and v_t = −2 m/s (up is opposite to positive, so negative). Δv = −2 − 5 = −7 m/s. The magnitude is 7 m/s, and the minus sign means Δv points up.



▶ **Watch 36:58, Example 4**

5. A, C and D. Take the initial direction as positive, so $v_0 = +2$ m/s. Only magnitudes are given, so check several cases. Case 1: $v_t = +4$ m/s, so $\Delta v = 4 - 2 = +2$ m/s, the same way as v_0 (C). Case 2: $v_t = -4$ m/s, so $\Delta v = -4 - 2 = -6$ m/s, opposite to v_0 (D) with magnitude 6 m/s (A). A magnitude of 4 m/s never happens (B is wrong).



Only magnitudes given? Watch for several cases.

▶ Watch 38:15, Example 5