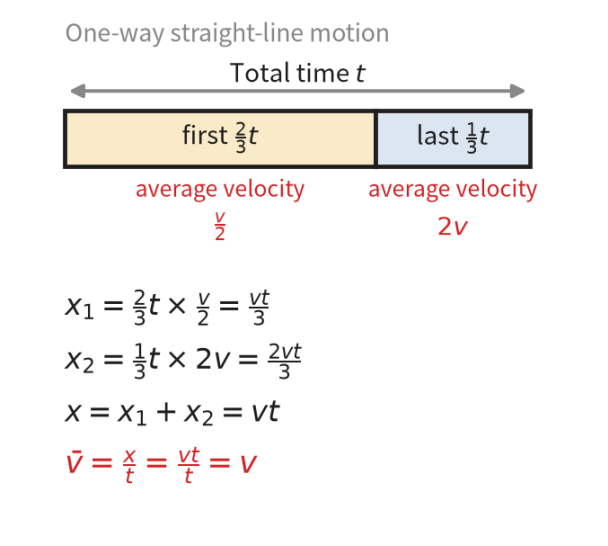
Answer key: How to Find Average Velocity of a Multi-Part Trip

Physics with Tiaotiao 跳跳 · Kinematics · High School Physics
Study sheet for the video "How to Find Average Velocity of a Multi-Part Trip": answer key

Answers and explanations

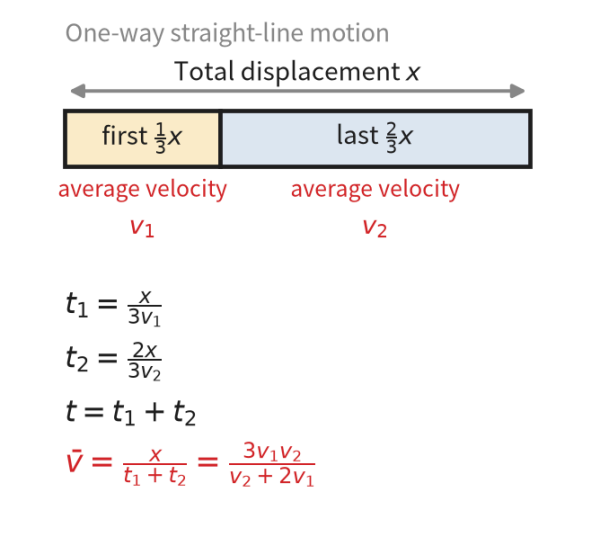
Tap a blue time to jump to the part of the video that explains the question.

1. C. One-way straight line, and we are given time information, so split by time. Let the total time be t. Segment 1 lasts 2t/3 and segment 2 lasts t/3.
x_1 = (2t/3)(v/2) = vt/3, x_2 = (t/3)(2v) = 2vt/3, so x = x_1 + x_2 = vt. Then average velocity = x / t = v.



Do not average v/2 and 2v directly. Always use total displacement ÷ total time.
▶ **Watch 6:16, Example 1**

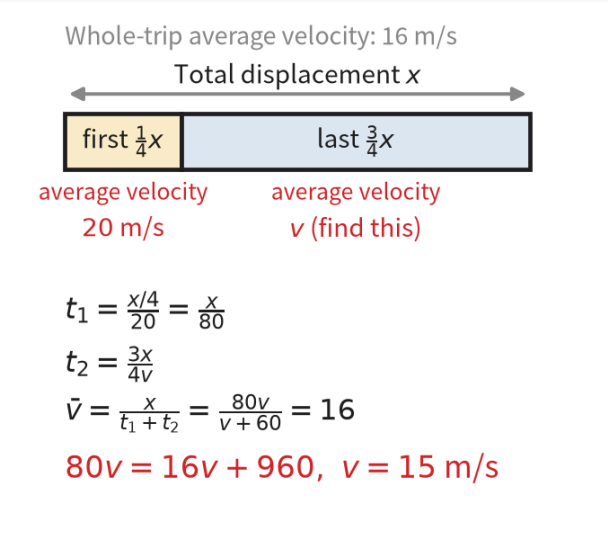
2. $3v_1v_2 / (v_2 + 2v_1)$. We are given displacement information, so split by displacement. Let the total displacement be x. Segment 1 is x/3 and segment 2 is 2x/3.
$t_1 = (x/3) \div v_1 = x / (3v_1)$, $t_2 = (2x/3) \div v_2 = 2x / (3v_2)$. Then average velocity = $x / (t_1 + t_2)$. Cancel x and use a common denominator to get $3v_1v_2 / (v_2 + 2v_1)$.



Check: if $v_1 = v_2 = v$, the result is v.

▶ **Watch 8:27, Example 2**

3. C. Split by displacement. Let the total displacement be x. Then $t_1 = (x/4) \div 20 = x/80$ and $t_2 = (3x/4) \div v = 3x/(4v)$.
Average velocity = $x / (t_1 + t_2) = 80v / (v + 60) = 16$. So $80v = 16v + 960$, and $v = 15$ m/s.



▶ **Watch 10:49, Example 3**