

FOCUSED REVIEW

Focused Review — Position, Displacement, and Velocity — Algebra-Based

Review the most important ideas, reinforce the essential skills, and confirm you're ready to move on.

 TIME 15–20 minutes	 BEST FOR Focused review	 FINISH WITH Greater confidence
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After this focused review, you'll be able to...

recognize the key concepts, reinforce your problem-solving skills, and continue with greater confidence.

HOW TO USE THIS GUIDE

Work through the stages in order. Write directly in the spaces provided, check your work in the Solutions section, and finish by choosing the next resource that matches your confidence.

Choose how you want to review: work through this guide, follow the online review, or watch the video review.

[Start the Review Online →](#)

[Watch the Video Review →](#)

YOU WILL NEED

Pencil or pen • Calculator if needed • Approximately 15–20 minutes

FR-02 • COURSE ALIGNMENT

Course Alignment

This Physics Sensei Topic Review is an independent learning resource. Use it to reinforce key concepts, prepare for homework, or review before a quiz or exam.

Related Unit Review: If you need to review the complete unit material, review [Motion in One Dimension here →](#)

RESOURCE: Physics Sensei Topic Review
TOPIC ID: MEC-U03-T01
TOPIC: Position, Displacement, and Velocity
PARENT UNIT: MEC-U03 — Motion in One Dimension
COURSE LEVEL: Algebra-Based introductory physics

BEST USED

- ✓ After learning the topic
- ✓ Before starting homework
- ✓ Before a quiz or exam

FR-03 • YOUR REVIEW PLAN

Your Review Plan

Complete these six focused stages in order. Each stage reinforces your understanding and prepares you for a final confidence check.

6 stages • Approximately 15–20 minutes

1 Warm-Up Check Refresh key ideas.	2 Core Concepts Reinforce the essentials.	3 Guided Practice Strengthen key skills.
4 Confidence Check Confirm your understanding.	5 Summary Remember the essentials.	6 Next Step Choose your next step.

PRINTING TIP

For student copies, print double-sided and keep the Solutions section after the student activities so learners attempt each activity before checking their work.

FR-04 • STAGE 1 OF 6

Warm-Up Check

Before you begin, take a minute to reactivate what you already know. This quick warm-up will help you focus on the most important ideas before moving on.

WARM-UP 1**Key Ideas**

State the signed change.

Write the displacement relationship using x_1 and x_2 .

WARM-UP 2**Common Mistakes**

Distinguish speed and velocity.

Can average speed be positive while average velocity is zero? Give the condition.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Read an x - t slope.

A straight position-time graph falls by 12 m in 4 s. What is the velocity?

Ready to strengthen your understanding?

You've refreshed the most important ideas. Now reinforce the concepts you'll use most often.

Continue to Core Concepts →

FR-05 • STAGE 2 OF 6

Core Concepts

Let's reinforce the most important concepts you'll need to solve problems with confidence. Focus on the ideas that appear most often in homework, quizzes, and exams.

KEY CONCEPT 1**Endpoint algebra: position and displacement**

Treat position as a signed coordinate. The displacement over an interval is the algebraic difference between final and initial positions; it is not the sum of distances traveled.

$$\Delta x = x_2 - x_1$$

EXAMPLE From +5 m to -7 m, $\Delta x = -12$ m.

SENSEI NOTE Keep the signs of the coordinates until after the subtraction.

KEY CONCEPT 2**Average velocity is the secant slope**

Average velocity is the change in position divided by the elapsed time. On an x - t graph it is the slope of the secant line joining the two endpoints of the interval.

$$\bar{v} = \Delta x / \Delta t$$

EXAMPLE A change from -2 m to +10 m over 6 s gives $\bar{v} = +2$ m/s.

SENSEI NOTE A positive position does not guarantee a positive velocity; velocity depends on how position changes.

Ready to apply these ideas?

You've reinforced the essential concepts. Now strengthen your problem-solving skills by working through a few guided examples.

Continue to Guided Practice →

FR-06 • STAGE 3 OF 6

Guided Practice

Now apply the key concepts you've just reviewed. Work through these focused practice activities to reinforce your problem-solving skills before the final confidence check.

PRACTICE 1**Guided Example**

Calculate with signed coordinates.

A cart has $x_1 = +11 \text{ m}$ at $t_1 = 2 \text{ s}$ and $x_2 = -1 \text{ m}$ at $t_2 = 6 \text{ s}$. Find Δx , Δt , and $\bar{v}$.

PRACTICE 2**Independent Check**

Use a piecewise trip.

A particle goes from $x = 0 \text{ m}$ to $+8 \text{ m}$ and then to $+3 \text{ m}$ in a total of 5 s . Find total distance, displacement, and average velocity.

Ready for a confidence check?

You've reinforced the essential skills through focused practice. Now confirm your understanding with two short questions.

Continue to Confidence Check →

FR-07 • STAGE 4 OF 6

Confidence Check

You've reinforced the key concepts and practiced the essential skills. Now confirm you're ready to move forward by completing these short confidence checks.

CONFIDENCE CHECK 1

Endpoint calculation

Show the sign.

From $x_1 = -4 \text{ m}$ to $x_2 = -10 \text{ m}$ in 3 s , find $\bar{v}$.

CONFIDENCE CHECK 2

Graph slope

Use $\Delta x / \Delta t$.

An x - t line goes from $(1 \text{ s}, 3 \text{ m})$ to $(5 \text{ s}, 15 \text{ m})$. Find its velocity.

HOW DID IT GO?

I answered ____ of 2 questions correctly.

Use the Solutions section to check your reasoning, then take one final look at the essential ideas.

You've confirmed your understanding.

Take one final look at the essential ideas before choosing your next step.

Continue to Summary →

FR-08 • STAGE 5 OF 6

Summary

Before moving on, take one final look at the essential ideas you'll want to remember.

KEY TAKEAWAY 1**Signed coordinates matter**

Use $\Delta x = x_2 - x_1$ and preserve signs through the algebra.

KEY TAKEAWAY 2**Velocity is a slope**

Average velocity equals $\Delta x / \Delta t$ and is the secant slope on an x - t graph.

MY ONE-SENTENCE SUMMARY

In my own words, the most important idea is:

Ready for your next step?

You've reviewed the essential ideas one last time. Now choose the resource that best matches how confident you feel.

Continue to Next Step →

ANSWER KEY • CHECK AFTER ATTEMPTING

Solutions and Explanations

Use these solutions to check your reasoning—not only your final answer. Use each answer and explanation to check both the setup and the physical interpretation.

WARM-UP • ACTIVITY 1

Key Ideas

$$\Delta x = x_2 - x_1.$$

WHY IT WORKS The order final minus initial fixes the direction sign.

WARM-UP • ACTIVITY 2

Common Mistakes

Yes. If an object travels and returns to its starting position, average speed is positive but average velocity is zero.

WHY IT WORKS Average speed uses distance; average velocity uses displacement.

WARM-UP • ACTIVITY 3

Quick Application

–3 m/s.

WHY IT WORKS For a straight x – t line, velocity equals slope $\Delta x/\Delta t$.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1**Guided Example**

$\Delta x = -12 \text{ m}$; $\Delta t = 4 \text{ s}$; $\bar{v} = -3 \text{ m/s}$.

WHY IT WORKS Compute each difference in the same final-minus-initial order.

PRACTICE 2**Independent Check**

Distance = 13 m; displacement = +3 m; average velocity = +0.6 m/s.

WHY IT WORKS Distance adds magnitudes of path segments; average velocity uses only the net displacement.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Endpoint calculation

$\Delta x = -6 \text{ m}$, so $\bar{v} = -2 \text{ m/s}$.

WHY IT WORKS Final minus initial gives a negative displacement, so the average velocity is negative.

CONFIDENCE CHECK 2

Graph slope

$+3 \text{ m/s}$.

WHY IT WORKS The slope is $(15 - 3) \text{ m} / (5 - 1) \text{ s} = 12/4 = 3 \text{ m/s}$.

READINESS GUIDE

2 correct: You're ready to continue. • 1 correct: Review the missed idea, then continue. • 0 correct: Revisit Core Concepts or choose more practice.

FR-09 • STAGE 6 OF 6

Next Step: Continue Learning

Great work! You've completed this focused review. Choose the next resource that best matches how confident you feel.

? I'm Still Unsure Review the focused review again to strengthen the essential concepts. Review Again →	🎯 I Need More Practice Build confidence with additional practice problems. Go to Practice →	✓ I'm Ready Continue to the next topic or learning resource. Continue →
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RECOMMENDED LINKS

[Review this topic again →](#)

[Find additional practice →](#)

[Choose another type of physics help →](#)

Continue reviewing with these companion resources.

[Start the Review Online →](#)

[Watch the Video Review →](#)

PHYSICS HELP THAT MAKES SENSE

A Physics Sensei review never ends at the last question. It always guides you toward the next useful step.

PhysicsSensei.com