

FOCUSED REVIEW

Focused Review — Vector Addition and Subtraction — Foundational

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 [Vectors and Components here →](#)

RESOURCE: Physics Sensei Topic Review
TOPIC ID: MEC-U02-T02
TOPIC: Vector Addition and Subtraction
PARENT UNIT: MEC-U02 — Vectors and Components
COURSE LEVEL: Foundational

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**

Picture the sum first.

Two vectors are placed head-to-tail. Where does the resultant start and end?

WARM-UP 2**Common Mistakes**

Reverse before subtracting.

To construct $\vec{A} - \vec{B}$ graphically, what change do you make to $\vec{B}$?

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Estimate before measuring.

$\vec{A}$ points east and $\vec{B}$ points north. In what general direction must $\vec{A} + \vec{B}$ point?

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

Vector Addition as a Net Change

Adding vectors combines directed changes. You may slide a vector without rotating it, place vectors head-to-tail, and draw the resultant from the starting point to the ending point.

$$\vec{R} = \vec{A} + \vec{B}$$

EXAMPLE: A 4 m east displacement followed by a 3 m north displacement has a resultant from the original start to the final location.

SENSEI NOTE: Keep each vector's direction unchanged when you translate it on the page.

KEY CONCEPT 2

Vector Subtraction Uses the Opposite

To subtract a vector, reverse its direction and then use the same head-to-tail addition rule. The negative vector has the same magnitude as the original but points opposite.

$$\vec{A} - \vec{B} = \vec{A} + (-\vec{B})$$

EXAMPLE: If $\vec{B}$ is 2 N west, then $-\vec{B}$ is 2 N east. Subtracting $\vec{B}$ therefore adds 2 N east.

SENSEI NOTE: The minus sign reverses the whole vector, not just its numerical label.

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**

Draw the vectors head-to-tail before answering.

A student walks 3 m east and then 4 m north. Find the magnitude and general direction of the resultant displacement.

PRACTICE 2**Independent Check**

Reverse the second vector, then combine.

$\vec{A}$ is 6 units east and $\vec{B}$ is 2 units east. Find $\vec{A} - \vec{B}$.

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

Opposite Directions

Give the resultant direction and magnitude.

A 7 N force points east and a 2 N force points west. What is the vector sum?

CONFIDENCE CHECK 2

Subtraction Meaning

State the graphical operation.

What is the first step when drawing $\vec{P} - \vec{Q}$?

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**Add Head-to-Tail**

The resultant runs from the initial tail to the final head and represents the net directed change.

KEY TAKEAWAY 2**Subtract by Reversing**

Replace subtraction with addition of the opposite vector; preserve both magnitude and direction information.

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.

WARM-UP • ACTIVITY 1

Key Ideas

It starts at the tail of the first vector and ends at the head of the last vector.

WHY IT WORKS: That arrow represents the net change produced by the sequence.

WARM-UP • ACTIVITY 2

Common Mistakes

Reverse $\vec{B}$, then add $-\vec{B}$ to $\vec{A}$.

WHY IT WORKS: Subtraction of a vector is defined as addition of its opposite.

WARM-UP • ACTIVITY 3

Quick Application

Between east and north, toward the northeast.

WHY IT WORKS: A correct sketch constrains the resultant direction before any calculation.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

5 m, toward the northeast.

WHY IT WORKS: The two perpendicular displacements form a 3–4–5 right triangle.

PRACTICE 2

Independent Check

4 units east.

WHY IT WORKS: Subtracting $\vec{B}$ is equivalent to adding 2 units west to $\vec{A}$.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Opposite Directions

5 N east.

WHY IT WORKS: Opposite collinear vectors subtract in magnitude, with the larger direction winning.

CONFIDENCE CHECK 2

Subtraction Meaning

Reverse $\vec{Q}$ to make $-\vec{Q}$, then add it to $\vec{P}$.

WHY IT WORKS: Vector subtraction is addition of the opposite vector.

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