

FOCUSED REVIEW

Focused Review — Significant Figures and Measurement Uncertainty — 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 [Units and Measurements here →](#)

RESOURCE: Physics Sensei Topic Review TOPIC ID: MEC-U01-T02 TOPIC: Significant Figures and Measurement Uncertainty PARENT UNIT: MEC-U01 — Units and Measurements COURSE LEVEL: Algebra-Based College Physics	BEST USED ✓ After learning the topic ✓ Before starting homework ✓ Before a quiz or exam
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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**

Answer before revealing the response.

How many significant figures are in 6.020×10^3 ?

WARM-UP 2**Common Mistakes**

Answer before revealing the response.

A result is 18.7426 cm from a calculation, but the inputs justify only three significant figures. How should it be reported?

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Answer before revealing the response.

A voltage is 12.0 ± 0.3 V. Estimate its percent uncertainty.

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

Rounding Rules for Calculated Results

For multiplication and division, the result is usually limited by the input with the fewest significant figures. For addition and subtraction, the limiting factor is decimal place rather than a raw count of significant figures. Keep extra digits during intermediate steps and round once at the end.

Multiplication/division: final significant figures follow the least-precise factor

EXAMPLE $(3.42)(2.1) = 7.182$ on the calculator, reported as 7.2 because 2.1 has two significant figures.

SENSEI NOTE Do not round every intermediate line; repeated rounding can shift the final answer.

KEY CONCEPT 2

Absolute and Percent Uncertainty

Absolute uncertainty has the same units as the measured quantity. Percent uncertainty expresses that uncertainty relative to the size of the measurement, making it easier to compare measurements of different magnitudes.

Percent uncertainty = (absolute uncertainty / measured value) × 100%

EXAMPLE For 80.0 ± 2.0 N, the percent uncertainty is 2.5%.

SENSEI NOTE A small absolute uncertainty can still be large in percentage terms if the measured value is small.

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**

Round a Product

Calculate $(4.62\text{ m})(3.1\text{ m})$ and report the area with appropriate significant figures.

PRACTICE 2**Independent Check**

Compare Relative Precision

Measurement A is $20.0 \pm 0.2\text{ cm}$. Measurement B is $5.0 \pm 0.2\text{ cm}$. Which has better relative precision?

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

Decimal-Place Rule

Apply the addition/subtraction rule.

Report $12.43 + 1.2 + 0.056$ with appropriate decimal precision.

CONFIDENCE CHECK 2

Percent Uncertainty

Compute the relative precision.

A mass is 125.0 ± 0.5 g. What is the percent uncertainty?

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**Round by the Operation**

Multiplication/division uses significant-figure limits; addition/subtraction uses decimal-place limits.

KEY TAKEAWAY 2**Use Relative Uncertainty**

Percent uncertainty compares measurement quality on a common scale and helps determine sensible reporting precision.

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. Replace each placeholder with a concise answer and the essential explanation.

WARM-UP • ACTIVITY 1

Key Ideas

6.020×10^3 has four significant figures.

WHY IT WORKS Scientific notation makes the intended significant digits explicit.

WARM-UP • ACTIVITY 2

Common Mistakes

Report 18.7 cm.

WHY IT WORKS Three significant figures retain only the digits justified by the input precision.

WARM-UP • ACTIVITY 3

Quick Application

About 2.5%.

WHY IT WORKS Relative uncertainty compares the uncertainty magnitude with the measured value.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

The calculator gives 14.322 m^2 . The factor 3.1 has two significant figures, so report 14 m^2 .

WHY IT WORKS The result follows the reporting rule emphasized in the corresponding practice item.

PRACTICE 2

Independent Check

A has 1% uncertainty; B has 4% uncertainty. Measurement A has better relative precision.

WHY IT WORKS The result follows the reporting rule emphasized in the corresponding practice item.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Decimal-Place Rule

The calculator gives 13.686; the least precise term is to the tenths place, so report 13.7.

WHY IT WORKS This check tests whether the stated precision matches the measurement or calculation rule being used.

CONFIDENCE CHECK 2

Percent Uncertainty

0.4%.

WHY IT WORKS This check tests whether the stated precision matches the measurement or calculation rule being used.

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