

FOCUSED REVIEW

Focused Review: Torque and Rotational Dynamics — Foundational

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

 TIME 15 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 minutes

FR-02 • COURSE ALIGNMENT

Course Alignment

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

RESOURCE: Physics Sensei Unit Review
UNIT ID: MEC-U20
TOPIC: Torque and Rotational Dynamics
COURSE LEVEL: Foundational / conceptual

BEST USED

- ✓ After learning the unit
- ✓ 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**

Match each idea to its meaning: torque; pivot/axis; lever arm; net torque. Then identify which quantity tells you whether angular motion changes.

Write your response in the space below.

WARM-UP 2**Common Mistakes**

State why each claim is incorrect: “Any force causes rotation,” and “The strongest force always creates the greatest torque.”

Write your response in the space below.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

A student pushes a wrench at two locations with the same force. Predict which location turns the bolt more easily and explain your reasoning.

Write your response in the space below.

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

How a Force Produces Torque

Torque is the rotational effect of a force about a chosen pivot. Its effectiveness depends on force, distance from the pivot, and direction. A force whose line of action passes through the pivot has zero torque.

Torque depends on force, lever arm, and direction.

EXAMPLE A door handle is placed far from the hinges to provide a large lever arm.

SENSEI NOTE Sketch the pivot and the force line of action before deciding the torque direction.

KEY CONCEPT 2

Net Torque and Rotational Response

Several forces can act at once. Their torques combine with signs based on rotational direction. If the net torque is zero, angular motion does not accelerate; if the net torque is nonzero, the rotational state changes.

Torque depends on force, lever arm, and direction.

EXAMPLE Balanced clockwise and counterclockwise torques can produce rotational equilibrium.

SENSEI NOTE Zero net force and zero net torque are different conditions; check both when equilibrium matters.

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**

A horizontal bar is pivoted at its center. Equal downward forces act at equal distances on opposite sides. Predict the direction of each torque and the net torque.

Show your setup and reasoning in the space below.

PRACTICE 2**Independent Check**

A child pushes tangentially on the edge of a playground merry-go-round. Another child pushes with the same force halfway to the center. Which push is more effective at changing the rotation? Explain.

Show your setup and reasoning in the space below.

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

Zero-Torque Force

Answer without looking back.

A force is applied to a rigid body, but its line of action passes exactly through the rotation axis. What torque does it produce about that axis?

CONFIDENCE CHECK 2

Direction of Angular Acceleration

Answer without looking back.

If the net torque on an object is counterclockwise, what can you say about its angular acceleration?

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**Lever Arm Matters**

Torque is larger when a force acts more effectively around the pivot, especially with a larger perpendicular lever arm.

KEY TAKEAWAY 2**Net Torque Changes Rotation**

The signed sum of torques determines whether angular motion accelerates and in which rotational direction.

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

Torque/rotation relationships recalled correctly. Use the unit's core definitions and equations appropriate to this treatment.

WHY IT WORKS These are the minimum ideas needed for the rest of the review.

WARM-UP • ACTIVITY 2

Common Mistakes

Correct the misconception by checking force geometry, torque sign, and the chosen rotation axis.

WHY IT WORKS Most rotational-dynamics errors begin in the setup, before any arithmetic.

WARM-UP • ACTIVITY 3

Quick Application

The left and right forces tend to rotate the bar in opposite directions. Because the force magnitudes and lever arms are equal, their torque magnitudes are equal and cancel; net torque is zero.

WHY IT WORKS The torque definition determines the rotational effectiveness of the force.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

The left and right forces tend to rotate the bar in opposite directions. Because the force magnitudes and lever arms are equal, their torque magnitudes are equal and cancel; net torque is zero.

WHY IT WORKS The solution applies the current Unit 20 torque/rotational-dynamics relationships consistently.

PRACTICE 2

Independent Check

The push at the edge is more effective because it has the larger lever arm. With the same force and direction, the larger distance from the axis produces the larger torque.

WHY IT WORKS The solution applies the current Unit 20 torque/rotational-dynamics relationships consistently.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Zero-Torque Force

Zero torque.

WHY IT WORKS The force has no perpendicular lever arm about the axis, so it has no turning effect.

CONFIDENCE CHECK 2

Direction of Angular Acceleration

Its angular acceleration is counterclockwise.

WHY IT WORKS Angular acceleration points in the direction of the net torque for rotation about a fixed axis.

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