QUICK REVIEW

Quick Review: Rotational Motion — Algebra-Based

5-minute algebra-based review of rotational motion, emphasizing algebraic rotational kinematics, torque, inertia, energy, and angular momentum problem solving.

◷	◎	✓
TIME	**BEST FOR**	**FINISH WITH**
5 minutes	Quick Review	Greater confidence

After this review, you'll be able to…

calculate rotational kinematics, torque, moment of inertia, rotational energy, and angular momentum using algebraic models and consistent signs.

HOW TO USE THIS GUIDE

Work through the four stages in order. Write directly in the spaces provided, check your work in the Quick Answers 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 5 minutes

QR-02 • UNIT ALIGNMENT

Unit Alignment

This Physics Sensei Unit Review covers MEC-U08 — Rotational Motion using the Algebra-Based treatment. Use it to reinforce the unit, prepare for homework, or review before a quiz or exam.

UNIT ID: MEC-U08 **UNIT: Rotational Motion** **TREATMENT: Algebra-Based** **RESOURCE: Unit Review**	**BEST USED** ✓ After reading the chapter ✓ Before starting homework ✓ Before a quiz or exam

Explore Rotational Motion Online →

Physics Sensei Unit Reviews use independent organization, wording, examples, and explanations.

FR-03 • YOUR REVIEW PLAN

Your Review Plan

Complete these four stages to quickly refresh the essential ideas and confirm you're ready to continue.

4 stages • Approximately 5 minutes

1 **Quick Recall — page 4** Refresh what you already know.	2 **Essential Idea — page 5** Review the most important concept.
3 **Confidence Check — page 6** Confirm you're ready to move on.	4 **Next Step — page 8** Continue your learning.

PRINTING TIP

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

FR-04 • STAGE 1 OF 4

Quick Recall

Let’s quickly refresh what you already know. This short recall activity will bring the most important ideas back to mind before you review them.

QUICK RECALL

Recall Activity

Complete these statements from memory before revealing the answer.

1) Convert revolutions to radians before using $s = r\theta$. 2) For constant α, choose a rotational kinematics equation that matches the knowns. 3) Net torque and moment of inertia must be calculated about the same axis.

Ready to refresh the essentials?

Great! Now review the most important idea you’ll want to remember.

Continue to Essential Idea — page 5 →

FR-05 • STAGE 2 OF 4

Essential Idea

Take one last look at the most important concept from this topic. If you remember this idea, the rest will come back much more easily.

ESSENTIAL IDEA

Signs, radians, and axis consistency

Use counterclockwise as positive unless another convention is stated. Constant-α equations mirror constant-acceleration kinematics, but θ must be in radians. For dynamics, calculate signed torques about one axis, calculate I about that same axis, then apply Στ = Iα.

$$\omega_f = \omega_i + \alpha t;\ \Delta\theta = \omega_i t + \tfrac{1}{2}\alpha t^2;\ v_t = r\omega;\ \tau = rF\sin\phi;\ \Sigma\tau = I\alpha.$$

EXAMPLE A wheel changes from 4 to 10 rad/s in 3 s with constant α. Then $\alpha = 2\ \text{rad/s}^2$.

SENSEI NOTE A radius is not automatically a lever arm. Use r sinϕ or the perpendicular distance to the force's line of action.

Ready to check your memory?

You've refreshed the essential idea. Now see how much you remember before moving on.

Continue to Confidence Check — page 6 →

FR-06 • STAGE 3 OF 4

Confidence Check

You've refreshed the essential idea. Now answer this quick confidence check to confirm you're ready to move on.

CONFIDENCE CHECK

Five-Minute Readiness Check

Answer without notes.

(1) A wheel has $\omega = -6$ rad/s and $\alpha = +2$ rad/s^2. Is it speeding up or slowing down? (2) What is the torque of a 10 N force applied 0.20 m from the axis at 90°? (3) If I doubles while net torque stays fixed, what happens to α?

Ready for your next step?

Great work! You've refreshed the essential idea. Now choose the resource that best matches what you'd like to do next.

Continue to Next Step — page 8 →

QUICK ANSWERS • CHECK AFTER ATTEMPTING

Quick Answers and Explanations

Use these concise answers to check your recall and confidence—not only your final response.

QUICK RECALL

Recall Activity

1) Convert revolutions to radians before using $s = r\theta$. 2) For constant α, choose a rotational kinematics equation that matches the knowns. 3) Net torque and moment of inertia must be calculated about the same axis.

WHY IT WORKS The recall targets axis choice, angular-versus-tangential quantities, torque, and conservation conditions.

CONFIDENCE CHECK

CONFIDENCE CHECK

Five-Minute Readiness Check

(1) Slowing down. (2) 2.0 N·m. (3) α is cut in half.

WHY IT WORKS The answers follow from sign reasoning, $\tau = rF$, and $\alpha = \tau/I$.

READINESS GUIDE

3 correct: You're ready to continue. • 2 correct: Review the missed idea. • 0–1 correct: Revisit the Essential Idea or choose more practice.

FR-07 • STAGE 4 OF 4

Next Step: Continue Learning

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

?	◎	✓
I'm Still Unsure	**I Need More Practice**	**I'm Ready**
Review the essential idea again.	Continue with additional practice for this topic.	Continue to the next recommended resource.
Review again: return to Essential Idea on page 5.	**Go to Practice →**	**Continue →**

RECOMMENDED LINKS

Review again: return to Essential Idea on page 5.

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