Self-Evaluation Rubric — Unit 7 Trig

Scoring Key · Use these symbols in each rubric cell:

✓ Correct **S** Mostly correct, careless error **H** Correct with help **G** Correct within a group ✗ Incorrect **N** Not attempted

Big Idea: With right-triangle trig, inverse trig, the area formula, Law of Sines, and Law of Cosines all established, the central skill is judgment — knowing which tool the given information calls for. These tools all emerge from the same source: the invariant ratios of similar triangles, extended by creating right triangles inside larger ones.

Subtopic	Basic	Intermediate	Advanced
Trig Ratios → *Discovering the invariants*	Can define sine, cosine, and tangent.	Can explain why trig ratios are invariant using similarity.	**(No descriptor for this level.)**
Solving for Missing Sides → *Using invariants*	Can use sine, cosine, or tangent to find missing sides. **Problem 3** Score: _____	Can choose the correct ratio and solve multistep problems correctly. **Problems 3, 10** Score: _____	Can model and solve real world problems using trig and justify my work. **Problems 3, 10** Score: _____
Solving for Missing Angles → *Using invariants as functions with inverses (for acute angles)*	**(No descriptor for this level.)**	Can use inverse trig to find a missing angle. **Problem 4** Score: _____	Can explain why inverse trig works and connect it to trig as a function. **Problems 4, 10** Score: _____
Special Right Triangles → *Invariant relationships worth remembering*	Can fill in a diagram with the respective side lengths given the angles. **Problem 7** Score: _____	Can use special right triangles to find exact side lengths. **Problem 7** Score: _____	Can show how the special right triangle values are derived using geometric reasoning. **Problem 7** Score: _____
Estimation → *Understanding trig as a function*	Can use special right angles to estimate the trig values. **Problem 11 (Part A)** Score: _____	Can describe how sine and cosine change as angles increase. **Problem 11 (Part B)** Score: _____	Can reason about whether an answer makes sense without a calculator and justify my reasoning. **Problem 12** Score: _____

Subtopic	Basic	Intermediate	Advanced
Trig Beyond Right Triangles *→ Extending invariants*	Can correctly use the Law of Sines and the Law of Cosines. **Problems 1, 2** Score: _____	Can determine which law applies in a given situation. **Problems 1, 2, 5, 9** Score: _____	Can explain why the laws work by connecting them to right angle trig and similarity. **Problems 1, 2, 5, 8, 9** Score: _____
Area of Any Triangle *→ A further extension of trig*	Can apply Area = ½ab·sin C when told which sides and angle to use. **Problem 6** Score: _____	Can identify the included angle and apply the formula independently. **Problems 6, 8** Score: _____	Can explain why Area = ½ab·sin C and connect it to the Law of Sines. **Problems 6, 8** Score: _____
Choose the Right Tool *→ Decision-making across all trig tools*	Can name the correct tool when the triangle type is identified for them. **Problems 1, 2, 3, 4** Score: _____	Can identify the correct tool from the given information without prompting. **Problems 1–6** Score: _____	Can explain the decision using the three-question framework and construct the decision tree from memory. **Problems 1–12** Score: _____

Where are you?
Look across each row. A correct basic problem means you are meeting the basic standard. A correct advanced problem — one where you can explain the reasoning clearly — means you are meeting the advanced standard. An honest middle falls between those two points.
A correct answer you cannot explain is not the same as one you own. The purpose of this rubric is not a score — it is an accurate picture of where you are so you know what to work on before the unit assessment.

Practice Problems

Problems 1 and 2 are required for everyone. After completing both, consult your rubric and choose the remaining problems based on where you need the most practice. You do not need to do every problem.

★ REQUIRED — Problem 1

In triangle ABC, angle A = 47°, angle B = 68°, and side a = 14 cm.
Find side b. State which tool you are using and why.

★ REQUIRED — Problem 2

In triangle PQR, p = 9, q = 12, and angle R = 53°.
Find side r. State which tool you are using and why.

Choose your remaining problems based on your rubric. Problems are labelled with the skill they address.

Problem 3

A ladder 8 m long leans against a wall. It makes a 72° angle with the ground. How high up the wall does it reach?

Problem 4

A wheelchair ramp rises 1.2 m over a horizontal distance of 9 m. What angle does it make with the ground?

Problem 5

A triangle has sides a = 7, b = 9, and c = 11. Find angle C (the angle opposite the longest side).

Problem 6

A triangle has two sides of length 8 cm and 11 cm, with an included angle of 47°. Find its area.

Problem 7

A right triangle has a hypotenuse of 10 and one angle of 30°. Find both legs exactly (no calculator).

Problem 8

In triangle ABC, angle A = 52°, angle B = 73°, and side a = 18 cm. Find side b and the area of the triangle.

Problem 9

In triangle ABC, a = 10, b = 14, and angle A = 38°. Find angle B.

Note: pay attention to whether more than one answer is possible.

Problem 10

An isosceles triangle has two equal sides of length 10 and a base of 12. Find the height of the triangle and the base angles.

Problem 11

Part A (Basic): Without a calculator, determine whether sin(55°) is closer to 0.707 or 0.866. Explain your reasoning using what you know about special right triangles.

Part B (Intermediate): As θ increases from 0° to 90°, what happens to tan θ? Explain using a right triangle with hypotenuse 1 why tan θ must increase — and why it increases faster and faster as θ approaches 90°.

Problem 12

A student uses a calculator and gets cos(25°) ≈ 0.423. Without using a calculator yourself, explain whether this answer is reasonable. Your explanation must reference specific values you know exactly and use them as benchmarks.