

Spatial Reasoning _ Sine Rule

Investigation Task: Road Safety

Assessment Criterion: D and C

Level	Task-Specific Descriptor	Sample Response
1–2	<p>The student:</p> <ul style="list-style-type: none"> Identifies very few details from the road safety situation Does not clearly recognize the triangle or needed values Uses an incorrect or unclear method Gives answers without justification 	<p>“The angles are 48° and 67°.” No side length used. No sine rule shown. No explanation about cameras or safety.</p>
3–4	<p>The student:</p> <ul style="list-style-type: none"> Identifies some relevant information (angles or distance between cameras) Attempts to use the Sine Rule but with mistakes Shows partial calculations Gives a simple or unclear statement about reasonableness 	<p>Writes sine rule incorrectly:</p> $\frac{AP}{\sin 48} = \frac{60}{\sin 67}$ <p>Gets wrong distance. States: “The answer makes sense.” (no context link).</p>
5–6	<p>The student:</p> <ul style="list-style-type: none"> Identifies most known and unknown values in the road safety scenario Uses the Sine Rule appropriately Calculates mostly correct distances Mentions rounding or small measurement errors Makes a basic link to road safety 	<p>“Angle P = 65°. AP ≈ 61 m and BP ≈ 49 m. Rounded to nearest meter. Cameras can see the crossing from this distance.”</p>
7–8	<p>The student:</p> <ul style="list-style-type: none"> Clearly identifies all relevant elements (distance between cameras, angles, unknown distances) Correctly selects the Sine Rule and explains why (AAS case) Applies it accurately to find distances Justifies accuracy using ±1° error impact Clearly explains why results are realistic for road safety 	<p>“Known: AB = 60 m, ∠A=48°, ∠B=67°. Unknown: AP and BP. ∠P = 65°. AP = 60sin67/sin65 ≈ 60.9 m. BP = 60sin48/sin65 ≈ 49.2 m. A ±1° error changes results by about 1–2 m, so values are reliable to the nearest meter. Distances of 50–60 m are realistic for traffic cameras to monitor pedestrian crossings.”</p>

Criterion C – Communicating

Level	Task-Specific Descriptor)	Sample Evidence (Answer Key)
1–2	The student shows limited communication. They write some numbers from the road safety problem but do not use correct symbols or terms. Work is disorganized and steps are missing, so the reasoning is unclear.	Writes only: “48°, 67°, 60 m.” No sine rule, no symbols, no explanation about cameras or triangle.
3–4	The student communicates some mathematics but not clearly. Some terms like “angle” or “distance” are used. Notation (sin, ∠) may be missing or incorrect. Diagram or equations may be incomplete. Some steps shown but others skipped.	Writes: “Angle P = 65. AP/sin67 = 60/sin65.” No labeled diagram. Limited explanation.
5–6	The student communicates clearly. Uses appropriate terms like “Sine Rule,” “angle,” and “triangle.” Includes a labeled diagram of cameras and crossing point. Calculations are shown in logical order and mostly easy to follow.	Shows: “∠P = 180 – (48+67) = 65°. AP/sin67 = 60/sin65. AP ≈ 61 m. ”Triangle labeled A, B, P.
7–8	The student communicates mathematics clearly and concisely. Correct symbols (∠, sin, ≈) and terminology are used. A well-labeled diagram of the road, cameras, and crossing is included. The solution flows logically from diagram → formula → calculation → answer. Work is neat and well organized.	Shows full reasoning: “Known: AB = 60 m, ∠A=48°, ∠B=67°. ∠P=65°. AP = 60sin67/sin65 ≈ 60.9 m. BP = 60sin48/sin65 ≈ 49.2 m. ”Clear steps and labeled diagram.