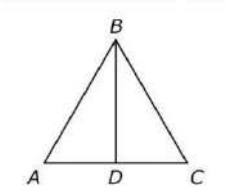
December Extended Constructed Response (ECR) Name:

Use the figure to complete the proof to establish part of this theorem: If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.



Part A:

Given: $AB = CB$; D is the midpoint of $\overline{AC}$.

Prove: $\overline{AC} \perp \overline{BD}$

Part B: Find the angle measurements of triangle ABC if angle CBD is 28 degrees.

Geometry December ECR
Score Rubric

<table>
<tr><th colspan="2">Part A</th></tr>
<tr><td>Score</td><td>Description</td></tr>
<tr><td>3</td><td>The response shows complete understanding of congruent triangles and the properties needed to prove that the lines are perpendicular. The proof contains logical steps and justification for each step to prove the lines are perpendicular.
Sample student response:
<table>
<tr><th>Statement</th><th>Reason</th></tr>
<tr><td>$AB = CB$</td><td>Given</td></tr>
<tr><td>$\overline{AB} \cong \overline{CB}$</td><td>Definition of congruent segments</td></tr>
<tr><td>D is the midpoint of $\overline{AC}$</td><td>Given</td></tr>
<tr><td>$\overline{BD}$ bisects $\overline{AC}$</td><td>Definition of segment bisector</td></tr>
<tr><td>$\overline{AD} \cong \overline{DC}$</td><td>Definition of midpoint</td></tr>
<tr><td>$\overline{BD} \cong \overline{BD}$</td><td>Reflexive property of segment congruence</td></tr>
<tr><td>$\Delta ADB \cong \Delta CDB$</td><td>SSS Congruence Postulate</td></tr>
<tr><td>$\angle ADB \cong \angle CDB$</td><td>Corresponding parts of congruent triangles are congruent. (CPCTC)</td></tr>
<tr><td>$m\angle ADB = m\angle CDB$</td><td>Definition of congruent angles</td></tr>
<tr><td>$m\angle ADB + m\angle CDB = 180°$</td><td>Definition of a straight angle</td></tr>
<tr><td>$m\angle ADB + m\angle ADB = 180°$</td><td>Substitution</td></tr>
<tr><td>$m\angle ADB = 90°$</td><td>Division property of equality</td></tr>
<tr><td>$\angle ADB$ is a right angle</td><td>Definition of a right angle</td></tr>
<tr><td>$\overline{AC} \perp \overline{BD}$</td><td>Definition of perpendicular lines</td></tr>
</table>
Note:

Credit can be earned for providing triangles congruent ($\Delta ADB \cong \Delta CDB$) with valid reasoning.
Credit can be earned for proving $\overline{AC} \perp \overline{BD}$ with valid reasoning.
The proof does not have to be a tow-column proof, but it needs to have the reasoning behind each step.
</td></tr>
<tr><td>2</td><td>The response shows some understanding of the logical proof process and attempts to write logical proof using congruent triangles and right angles but makes mistakes logic and steps in justification.</td></tr>
<tr><td>1</td><td>The response shows minimal understanding and attempts to write a proof.</td></tr>
<tr><td>0</td><td>The response shows minimal understanding and attempts to write a proof.</td></tr>
<tr><th colspan="2">Part B</th></tr>
<tr><td>Score</td><td>Description</td></tr>
<tr><td>2</td><td>Student response includes the following 2 elements.
* Logical reasoning for finding 3 angle measurements of triangle ABC
* Correct computation for 3 angle measurements of triangle ABC.
Sample of student response:
Angel CBD = angle ABD = 28 degree
Angle ABC = 28 + 28 = 56
Angle BAC = Angle BCA = (180-56)/2 = 62 degrees</td></tr>
<tr><td>1</td><td>Student response includes 1 of 2 elements</td></tr>
<tr><td>0</td><td>Student response is incorrect or irrelevant</td></tr>
</table>

Genesis Convert Table

Task Point	Genesis Score
0	55
1	59
2	69
3	79
4	89
5	100

Geometry December ECR