Incenter and Circumcenter Quiz

Multiple Choice
*Identify the choice that best completes the statement or answers the question.*

1. The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.

This construction represents how to find the intersection of
a. the angle bisectors of $\triangle ABC$
b. the medians to the sides of $\triangle ABC$
c. the altitudes to the sides of $\triangle ABC$
d. the perpendicular bisectors of the sides of $\triangle ABC$

2. Which geometric principle is used in the construction shown below?

a. The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
b. The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
c. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed circle.
d. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the circumscribed circle.
3. Three towns, Maybury, Junesville, and Cyanna, will create one sports center. Where should the center be placed so that it is the same distance from all three towns?
   a. Treat the towns as vertices of a triangle. The center must be placed at the triangle’s circumcenter.
   b. Treat the towns as vertices of a triangle. The center must be placed at the triangle’s incenter.
   c. Treat the towns as sides of a triangle. The center must be placed at the triangle’s circumcenter.
   d. Treat the towns as sides of a triangle. The center must be placed at the triangle’s incenter.

4. In the diagram below of $\triangle ABC$, $\overline{CD}$ is the bisector of $\angle BCA$, $\overline{AE}$ is the bisector of $\angle CAB$, and $\overline{BG}$ is drawn.

Which statement must be true?
   a. $DG = EG$
   b. $AG = BG$
   c. $\angle AEB \equiv \angle AEC$
   d. $\angle DBG \equiv \angle EBG$

5. $\overline{ZO}$, $\overline{YO}$, and $\overline{XO}$ are the perpendicular bisectors of $\triangle ABC$. Find $AO$.

Which value is correct for $AO$?
   a. $AO = 4.2$
   b. $AO = 3.4$
   c. $AO = 7.4$
   d. $AO = 14.8$
Incenter and Circumcenter Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: D  PTS: 2  REF: 080925ge  STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

2. ANS: A  PTS: 2  REF: 081028ge  STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

3. ANS: A
   Let the three towns be vertices of a triangle. By the Circumcenter Theorem, the circumcenter of the triangle
   is equidistant from the vertices. To find the circumcenter, find the perpendicular bisectors of each side. Their
   intersection is the circumcenter.

<table>
<thead>
<tr>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Correct!</td>
</tr>
<tr>
<td>B The center must be placed at the triangle's circumcenter.</td>
</tr>
<tr>
<td>C Treat the towns as vertices of a triangle.</td>
</tr>
<tr>
<td>D Treat the towns as vertices of a triangle. The center must be placed at the triangle's circumcenter.</td>
</tr>
</tbody>
</table>

PTS: 1  DIF: Average  REF: 1ad9a29e-4683-11df-9c7d-001185f0d2ea
OBJ: 5-2.4 Application  STA: NY.NYLES.MTH.05.GEO.G.G.21
LOC: MTH.C.11.03.02.02.03.006  TOP: 5-2 Bisectors of Triangles
KEY: circumcenter  DOK: DOK 2

4. ANS: D
   \(BG\) is also an angle bisector since it intersects the concurrence of \(CD\) and \(AE\)

PTS: 2  REF: 061025ge  STA: G.G.21
KEY: Centroid, Orthocenter, Incenter and Circumcenter

5. ANS: A
   O is the circumcenter of \(\Delta ABC\). By the Circumcenter Theorem, O is equidistant from the vertices of \(\Delta ABC\).
   \(BO = AO\)  Circumcenter Theorem
   \(AO = 4.2\)  Substitute 4.2 for \(BO\).

<table>
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<tr>
<td>A Correct!</td>
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<tr>
<td>B (O) is equidistant from the vertices, so (BO = AO).</td>
</tr>
<tr>
<td>C (O) is equidistant from the vertices, so (BO = AO).</td>
</tr>
<tr>
<td>D (O) is equidistant from the vertices, so (BO = AO).</td>
</tr>
</tbody>
</table>

PTS: 1  DIF: Average  REF: 1ad71932-4683-11df-9c7d-001185f0d2ea
OBJ: 5-2.1 Using Properties of Perpendicular Bisectors  STA: NY.NYLES.MTH.05.GEO.G.G.21
LOC: MTH.C.11.03.02.02.03.006  TOP: 5-2 Bisectors of Triangles
KEY: perpendicular bisector | circumcenter  DOK: DOK 1
Incenter and Circumcenter Quiz

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. The diagram below shows the construction of the center of the circle circumscribed about $\triangle ABC$.

This construction represents how to find the intersection of
a. the altitudes to the sides of $\triangle ABC$
b. the perpendicular bisectors of the sides of $\triangle ABC$
c. the angle bisectors of $\triangle ABC$
d. the medians to the sides of $\triangle ABC$

2. Which geometric principle is used in the construction shown below?

a. The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
b. The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
c. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the circumscribed circle.
d. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed circle.
3. Three towns, Maybury, Junesville, and Cyanna, will create one sports center. Where should the center be placed so that it is the same distance from all three towns?
   a. Treat the towns as vertices of a triangle. The center must be placed at the triangle’s incenter.
   b. Treat the towns as sides of a triangle. The center must be placed at the triangle’s incenter.
   c. Treat the towns as vertices of a triangle. The center must be placed at the triangle’s circumcenter.
   d. Treat the towns as sides of a triangle. The center must be placed at the triangle’s circumcenter.

4. In the diagram below of \( \triangle ABC \), \( \overline{CD} \) is the bisector of \( \angle BCA \), \( \overline{AE} \) is the bisector of \( \angle CAB \), and \( \overline{BG} \) is drawn.

   Which statement must be true?
   a. \( AG = BG \)
   b. \( \angle DBG \equiv \angle EBG \)
   c. \( DG = EG \)
   d. \( \angle AEB \equiv \angle AEC \)

5. \( \overline{ZO}, \overline{YO}, \) and \( \overline{XO} \) are the perpendicular bisectors of \( \triangle ABC \). Find \( AO \).

   \[ \begin{align*}
   a. \quad & AO = 4.2 \\
   b. \quad & AO = 3.4 \\
   c. \quad & AO = 14.8 \\
   d. \quad & AO = 7.4
   \end{align*} \]
Incenter and Circumcenter Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: B  PTS: 2  REF: 080925ge  STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

2. ANS: A  PTS: 2  REF: 081028ge  STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

3. ANS: C
   Let the three towns be vertices of a triangle. By the Circumcenter Theorem, the circumcenter of the triangle is equidistant from the vertices. To find the circumcenter, find the perpendicular bisectors of each side. Their intersection is the circumcenter.

   Feedback
   A The center must be placed at the triangle's circumcenter.
   B Treat the towns as vertices of a triangle. The center must be placed at the triangle's circumcenter.
   C Correct!
   D Treat the towns as vertices of a triangle.

   PTS: 1  DIF: Average  REF: 1ad9a29e-4683-11df-9c7d-001185f0d2ea
   OBJ: 5-2.4 Application  STA: NY.NYLES.MTH.05.GEO.G.G.21
   LOC: MTH.C.11.03.02.02.03.006  TOP: 5-2 Bisectors of Triangles
   KEY: circumcenter  DOK: DOK 2

4. ANS: B
   \( BG \) is also an angle bisector since it intersects the concurrence of \( CD \) and \( AE \)

   PTS: 2  REF: 061025ge  STA: G.G.21
   KEY: Centroid, Orthocenter, Incenter and Circumcenter

5. ANS: A
   O is the circumcenter of \( \triangle ABC \). By the Circumcenter Theorem, O is equidistant from the vertices of \( \triangle ABC \).
   \( BO = AO \)  Circumcenter Theorem
   \( AO = 4.2 \)  Substitute 4.2 for \( BO \).

   Feedback
   A Correct!
   B \( O \) is equidistant from the vertices, so \( BO = AO \).
   C \( O \) is equidistant from the vertices, so \( BO = AO \).
   D \( O \) is equidistant from the vertices, so \( BO = AO \).

   PTS: 1  DIF: Average  REF: 1ad71932-4683-11df-9c7d-001185f0d2ea
   OBJ: 5-2.1 Using Properties of Perpendicular Bisectors  STA: NY.NYLES.MTH.05.GEO.G.G.21
   LOC: MTH.C.11.03.02.02.03.006  TOP: 5-2 Bisectors of Triangles
   KEY: perpendicular bisector / circumcenter  DOK: DOK 1
Incenter and Circumcenter Quiz

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. The diagram below shows the construction of the center of the circle circumscribed about \( \triangle ABC \).

![Diagram of circle circumscribed about triangle]

This construction represents how to find the intersection of
a. the angle bisectors of \( \triangle ABC \)
b. the perpendicular bisectors of the sides of \( \triangle ABC \)
c. the medians to the sides of \( \triangle ABC \)
d. the altitudes to the sides of \( \triangle ABC \)

____ 2. Which geometric principle is used in the construction shown below?

![Diagram of circle inscribed in triangle]

a. The intersection of the angle bisectors of a triangle is the center of the circumscribed circle.
b. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the inscribed circle.
c. The intersection of the angle bisectors of a triangle is the center of the inscribed circle.
d. The intersection of the perpendicular bisectors of the sides of a triangle is the center of the circumscribed circle.
3. Three towns, Maybury, Junesville, and Cyanna, will create one sports center. Where should the center be placed so that it is the same distance from all three towns?
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   d. Treat the towns as sides of a triangle. The center must be placed at the triangle’s circumcenter.

4. In the diagram below of $\triangle ABC$, $\overline{CD}$ is the bisector of $\angle BCA$, $\overline{AE}$ is the bisector of $\angle CAB$, and $\overline{BG}$ is drawn.

Which statement must be true?
   a. $DG = EG$
   b. $AG = BG$
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   d. $\angle DBG \equiv \angle EBG$

5. $\overline{ZO}$, $\overline{YO}$, and $\overline{XO}$ are the perpendicular bisectors of $\triangle ABC$. Find $AO$.

   a. $AO = 7.4$
   b. $AO = 4.2$
   c. $AO = 3.4$
   d. $AO = 14.8$
Incenter and Circumcenter Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 2 REF: 080925ge STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

2. ANS: C PTS: 2 REF: 081028ge STA: G.G.21
   TOP: Centroid, Orthocenter, Incenter and Circumcenter

3. ANS: A
   Let the three towns be vertices of a triangle. By the Circumcenter Theorem, the circumcenter of the triangle
   is equidistant from the vertices. To find the circumcenter, find the perpendicular bisectors of each side. Their
   intersection is the circumcenter.

   Feedback
   A Correct!
   B The center must be placed at the triangle's circumcenter.
   C Treat the towns as vertices of a triangle. The center must be placed at the triangle's
      circumcenter.
   D Treat the towns as vertices of a triangle.

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   OBJ: 5-2.4 Application STA: NY.NYLES.MTH.05.GEO.G.G.21
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   KEY: circumcenter DOK: DOK 2

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   BG is also an angle bisector since it intersects the concurrency of CD and AE

   PTS: 2 REF: 061025ge STA: G.G.21
   KEY: Centroid, Orthocenter, Incenter and Circumcenter

5. ANS: B
   O is the circumcenter of ΔABC. By the Circumcenter Theorem, O is equidistant from the vertices of ΔABC.
   BO = AO Circumcenter Theorem
   AO = 4.2 Substitute 4.2 for BO.

   Feedback
   A O is equidistant from the vertices, so BO = AO.
   B Correct!
   C O is equidistant from the vertices, so BO = AO.
   D O is equidistant from the vertices, so BO = AO.

   PTS: 1 DIF: Average REF: 1ad71932-4683-11df-9c7d-001185f0d2ea
   OBJ: 5-2.1 Using Properties of Perpendicular Bisectors STA: NY.NYLES.MTH.05.GEO.G.G.21
   LOC: MTH.C.11.03.02.02.03.006 TOP: 5-2 Bisectors of Triangles
   KEY: perpendicular bisector | circumcenter DOK: DOK 1