G.C.A.3: Inscribed Quadrilaterals

1. In the diagram below, quadrilateral $JUMP$ is inscribed in a circle.

   Opposite angles $J$ and $M$ must be
   1) right
   2) complementary
   3) congruent
   4) supplementary

2. In the diagram below, quadrilateral $ABCD$ is inscribed in circle $P$.

   What is $m \angle ADC$?
   1) $70^\circ$
   2) $72^\circ$
   3) $108^\circ$
   4) $110^\circ$

3. Quadrilateral $ABCD$ is inscribed in circle $O$, as shown below.

   If $m \angle A = 80^\circ$, $m \angle B = 75^\circ$, $m \angle C = (y + 30)^\circ$, and $m \angle D = (x - 10)^\circ$, which statement is true?
   1) $x = 85$ and $y = 50$
   2) $x = 90$ and $y = 45$
   3) $x = 110$ and $y = 75$
   4) $x = 115$ and $y = 70$

4. Linda is designing a circular piece of stained glass with a diameter of 7 inches. She is going to sketch a square inside the circular region. To the nearest tenth of an inch, the largest possible length of a side of the square is
   1) 3.5
   2) 4.9
   3) 5.0
   4) 6.9
5 In the diagram below, trapezoid $ABCD$, with bases $\overline{AB}$ and $\overline{DC}$, is inscribed in circle $O$, with diameter $\overline{DC}$. If $m\overline{AB} = 80$, find $m\overline{BC}$.

6 As shown in the diagram below, quadrilateral $DEFG$ is inscribed in a circle and $m\angle D = 86$. Determine and state $m\overline{GFE}$. Determine and state $m\angle F$.

7 In the accompanying diagram, quadrilateral $ABCD$ is inscribed in circle $O$. If $m\overline{AB} = 132$ and $m\overline{BC} = 82$, find $m\angle ADC$.

8 In the diagram below, quadrilateral $ABCD$ is inscribed in circle $O$, and $m\overline{CD} : m\overline{DA} : m\overline{AB} : m\overline{BC} = 2:3:5:5$. Determine and state $m\angle B$. 
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#### Answer Section

1. ANS: 4  REF: 011124geo
2. ANS: 3  REF: 081515geo
3. ANS: 4  
   Opposite angles of an inscribed quadrilateral are supplementary.  
   REF: 011821geo
4. ANS: 2  
   \[ s^2 + s^2 = 7^2 \]
   \[ 2s^2 = 49 \]
   \[ s^2 = 24.5 \]
   \[ s \approx 4.9 \]
   REF: 081511geo
5. ANS:  
   \[ \frac{180 - 80}{2} = 50 \]
   REF: 081129ge
6. ANS:  
   \[ 86^\circ \cdot 2 = 172^\circ \quad 180^\circ - 86^\circ = 94^\circ \]
   REF: 081432ge
7. ANS: 107  
   REF: 088408siii
8. ANS:  
   \[ \frac{2 + 3}{15} \cdot 360 = 120 \quad \frac{120}{2} = 60 \]
   REF: 062226geo