Regents: Similar triangles in circles
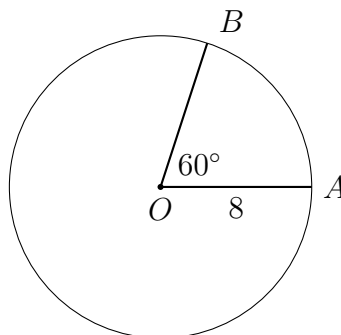
1. Circle O has a radius $AO = 8$, as shown below, and $m\angle AOB = 60°$.

   (a) Find the arc measure $m\widehat{AB}$.

   (b) Find the length of the arc $\widehat{AB}$.
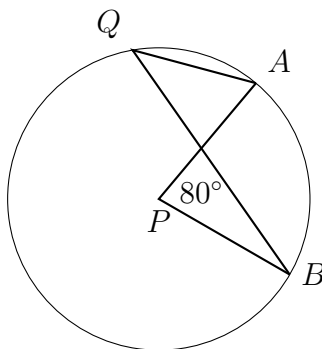
   (c) Find the area of the sector AOB.

2. Given circle P with $m\angle APB = 80°$.
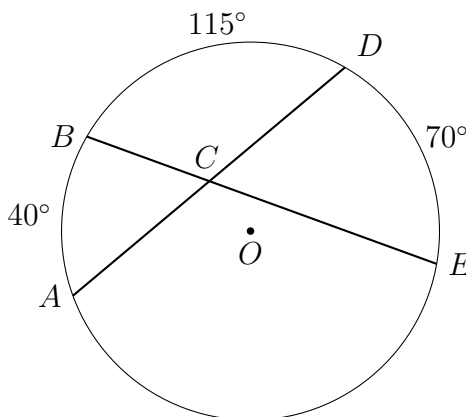
   (a) Write down the $m\widehat{AB}$.

   (b) Find the $m\angle AQB$.

3. Given circle O with chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, as shown in the diagram. Given $m\widehat{AB} = 40°$, $m\widehat{BD} = 115°$, and $m\widehat{DE} = 70°$.

   (a) Find the $m\angle ACB$.
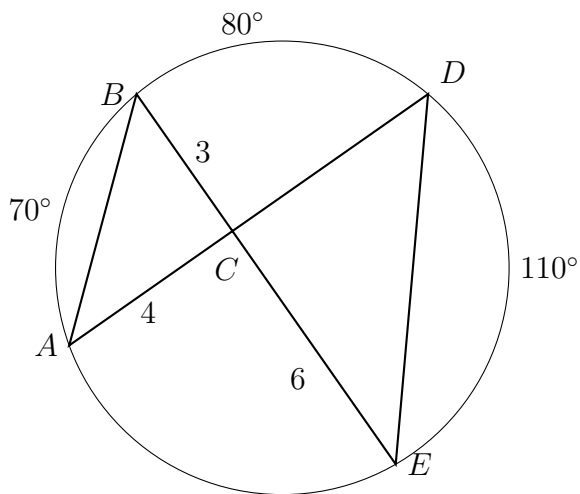
   (b) Find the measure of the minor arc, $m\widehat{AE}$.

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4. Given circle O with chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, as shown in the diagram. Given $m\widehat{AB} = 70°$, $m\widehat{BD} = 80°$, and $m\widehat{DE} = 110°$.

    (a) Find the $m\angle BED$.

    (b) Find the $m\angle ACB$.

    (c) Given $AC = 4$ and $BC = 3$, find AB.
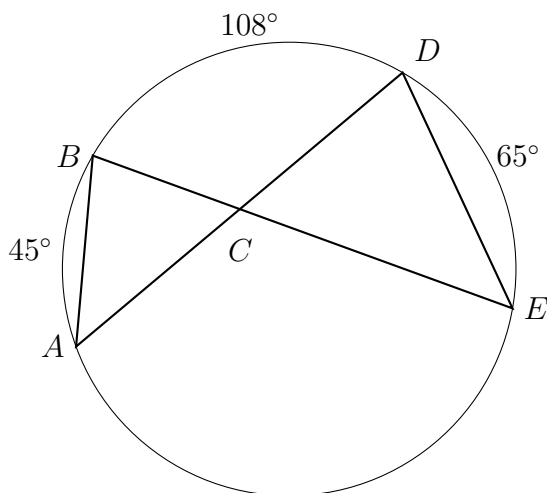
80°

D

B

3

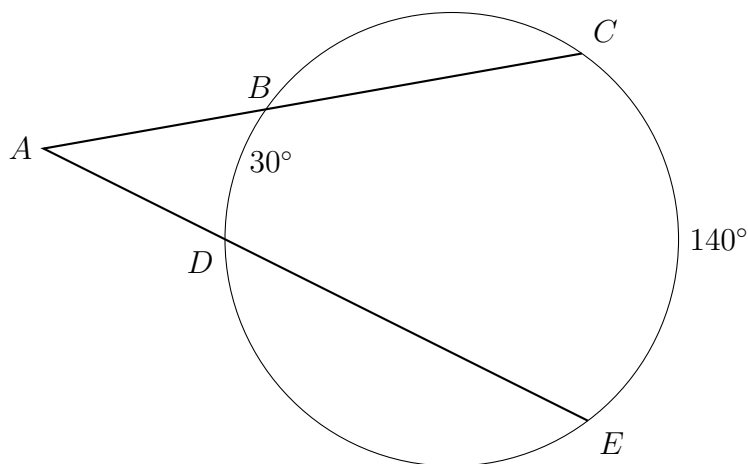70°

C

110°

4

A

6

E

    (d) Given $CE = 6$, find CD.

5. Given circle O with chords $\overline{AD}$ and $\overline{BE}$ intersecting at C, as shown in the diagram. Given $m\widehat{AB} = 45°$, $m\widehat{BD} = 108°$, and $m\widehat{DE} = 65°$.
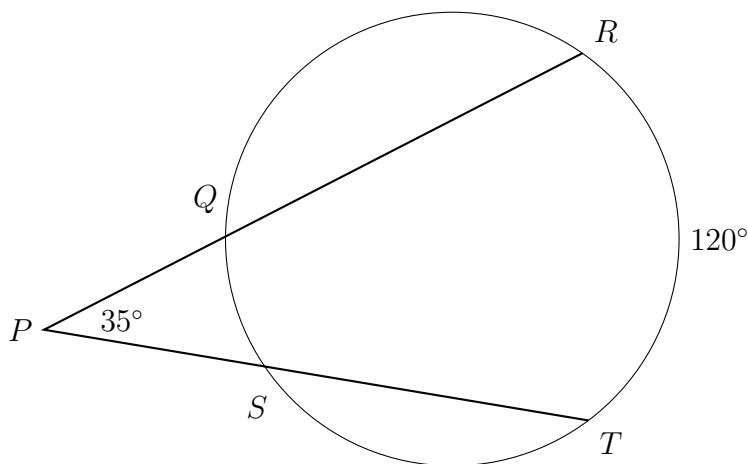
    (a) Find the $m\angle BAD$.

    (b) Find the $m\angle ACB$.

108°

D

B

65°

45°

C

E

A

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6. The secants $\overline{ABC}$ and $\overline{ADE}$ intersect the circle O, as shown in the diagram. Given $m\widehat{BD} = 30°$ and $m\widehat{CE} = 140°$. Find the $m\angle A$.
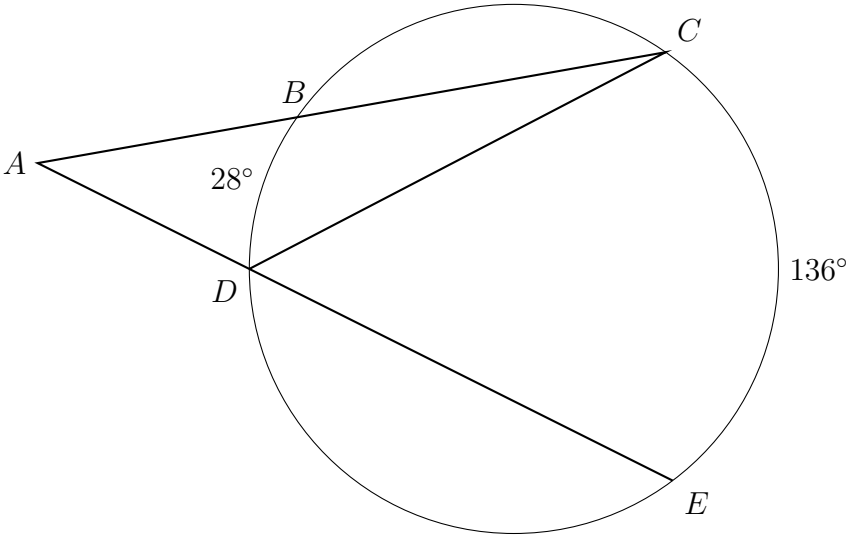
7. The secants $\overline{PQR}$ and $\overline{PST}$ intersect the circle O, as shown in the diagram. Given $m\angle P = 35°$ and $m\widehat{RT} = 120°$. Find the $m\widehat{QS}$.

8. The secants $\overline{ABC}$ and $\overline{ADE}$ intersect the circle O, as shown in the diagram. Given $m\widehat{BD} = 28°$ and $m\widehat{CE} = 136°$.

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(a) Find the $m\angle CDE$.   (b) Find the $m\angle BCD$.

(c) Find the $m\angle A$.

9. Write down the center and radius of each circle.

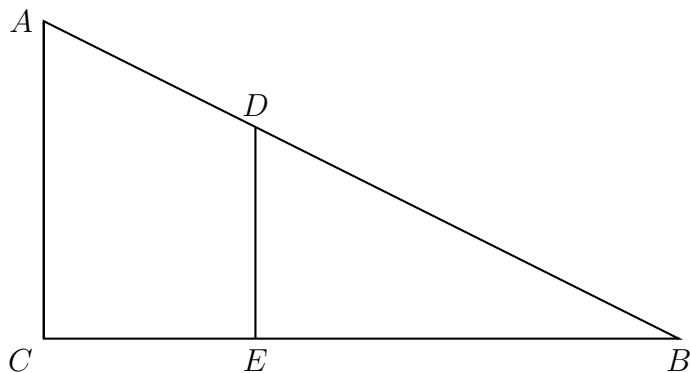   (a) $(x - 4)^2 + (y - 3)^2 = 9$ (c) $x^2 + y^2 = 4$

   (b) $(x + 5)^2 + (y - 2)^2 = 4^2$ (d) $(x + 7)^2 + (y - 2)^2 = 9^2$

10. Write down the center and radius of each circle.

   (a) $(x + 1)^2 + (y - 3)^2 = 49$ (c) $x^2 + y^2 = 20$

   (b) $(x + 4)^2 + (y + 2)^2 = 5^2$ (d) $(x + 1)^2 + (y - 2)^2 = 121$

11. In right triangle ABC shown below, point D is on $\overline{AB}$ and point E is on $\overline{BC}$ such that $\overline{AC} \parallel \overline{DE}$. Given $BD = 10$, $BC = 12$, and $EC = 4$.

(a) Find the length of $\overline{BE}$.

(b) Find the scale factor, k, dilating $\triangle DBE \rightarrow \triangle ABC$, centered at B.

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(c) Find the area of $\triangle ABC$.

(d) Find the area of $\triangle DEB$.

(e) Find the ratio of the areas of the two triangles.