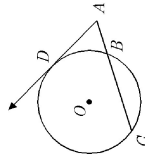
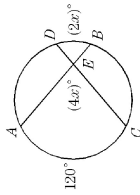


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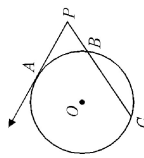
1. In the accompanying figure, \overline{AD} is tangent to circle O at D and \overline{ABC} is a secant. If $AD = 4$ and $AC = 8$, find AB .



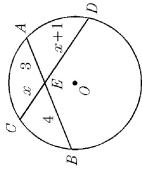
3. In the diagram below, chords \overline{AB} and \overline{CD} intersect at E . If $m\angle AEC = 4x$, $m\angle C = 120^\circ$, and $m\angle DB = 2x$, what is the value of x ?



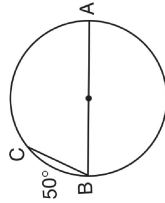
2. In the accompanying diagram, \overline{PA} is tangent to circle O at A . If $CB = 12$ and $PB = 4$, what is the length of \overline{PA} ?



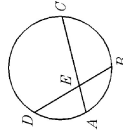
5. In the accompanying diagram of circle O , chords \overline{AB} and \overline{CD} intersect at E . If $AE = 3$, $EB = 4$, $CE = x$, and $ED = x + 1$, find CE .



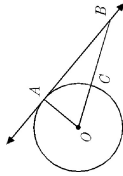
6. In the accompanying diagram, \overline{BA} is a diameter and $m\angle C = 50^\circ$. Find $m\angle CBA$.



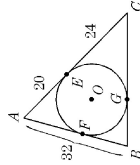
7. In the accompanying diagram of a circle, chords \overline{AC} and \overline{BD} intersect at point E . $DE = 6$, $EB = 4$, and $AE = 3$. What is EC ?



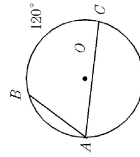
8. In the accompanying diagram, \overline{BA} is tangent to circle O at A . Radii \overline{OA} and \overline{OC} are drawn, and \overline{OC} is extended to intersect \overline{BA} at B . If $BA = 15$ and $OB = 17$, find the measure of a radius of circle O .



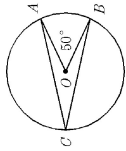
9. In the accompanying diagram, \overline{AFB} , \overline{AEC} , and \overline{BGC} are tangent to circle O at F , E , and G , respectively. If $AB = 32$, $AE = 20$, and $EC = 24$, find BC .



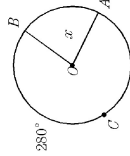
10. In the accompanying diagram, $m\angle C = 120^\circ$. Find the measure of inscribed angle BAC .



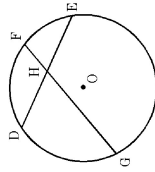
11. In the accompanying figure, the measure of angle AOB is 50. Find the measure of inscribed angle ACB .



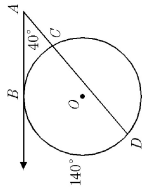
12. In the accompanying diagram of circle O , arc ACB has a measure of 280. What is the measure of central angle x ?



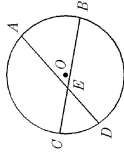
13. In the accompanying diagram, chords \overline{DE} and \overline{FG} intersect at H . If $DE = 18$, $HE = 8$, and $HF = 5$, find GH .



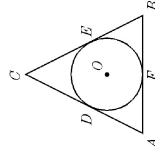
14. In the accompanying diagram, \overline{AB} is tangent to circle O at B and \overline{ACD} is a secant. If $m\angle A = 40$ and $m\widehat{BD} = 140$, find $m\widehat{BC}$.



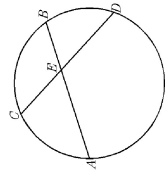
15. In the accompanying diagram of circle O , $m\widehat{AB} = 64$ and $m\angle AEB = 52$. What is the measure of \widehat{CD} ?



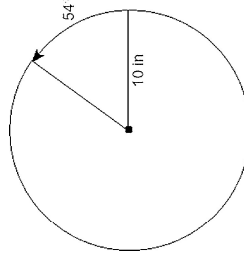
16. In the accompanying diagram, circle O is inscribed in $\triangle ABC$ so that the circle is tangent to \overline{AB} at F , to \overline{BC} at E , and to \overline{AC} at D . If $AF = FB = 5$ and $DC = 7$, find the perimeter of $\triangle ABC$.



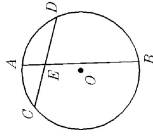
17. In the accompanying diagram, chords \overline{AB} and \overline{CD} intersect at E . If $m\widehat{AC} = 75$ and $m\widehat{DB} = 45$, find $m\angle AED$.



18. A ball is rolling in a circular path that has a radius of 10 inches, as shown in the accompanying diagram. What distance has the ball rolled when the subtended arc is 54° ? Express your answer to the nearest hundredth of an inch.



19. In the accompanying diagram of circle O , chords \overline{AB} and \overline{CD} intersect at point E . If $AE = 2$, $CE = 9$, and $CE = 4$, find BE .



20. Kathy and Tami are at point A on a circular track that has a radius of 150 feet, as shown in the accompanying diagram. They run counterclockwise along the track from A to S , a distance of 247 feet. Find, to the nearest degree, the measure of minor arc AS .

