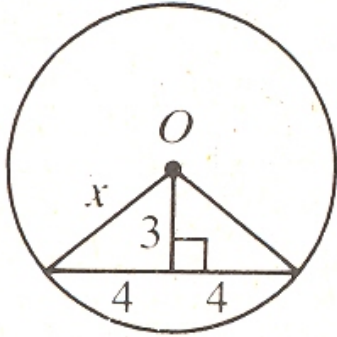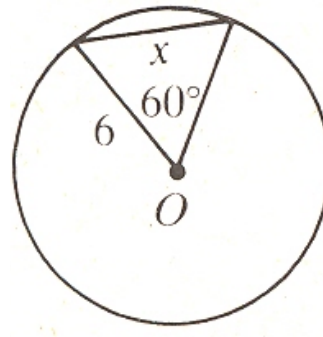DIRECTIONS: Solve for x. O is the center of each circle. Use the Pythagorean Theorem and your knowledge of 45-45-90 & 30-60-90 triangles.
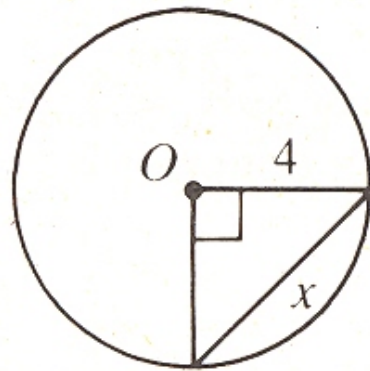
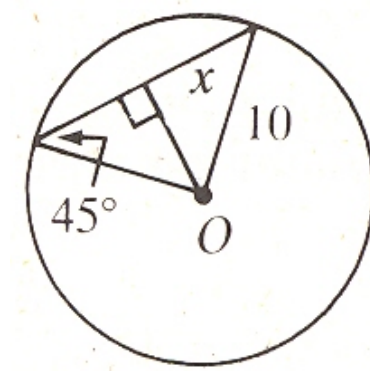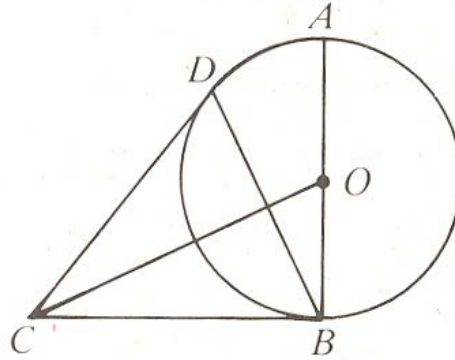**1.** $x =$ _____

2. $x =$ _____

3. $x =$ _____

4. $x =$ _____

<u>DIRECTIONS</u>: $\overleftrightarrow{CB}$ and $\overleftrightarrow{CD}$ are tangent to circle O at B and D, respectively. Remember that when a tangent and a radius intersect at a point of tangency, they are perpendicular!

5. If $OC = 15$ and $OB = 9$, then $BC =$ _____

6. If $OC = 3\sqrt{6}$ and $BC = 6$, then $OB =$ _____

7. If $AB = 12$ and $BC = 8$, then $OC =$ _____

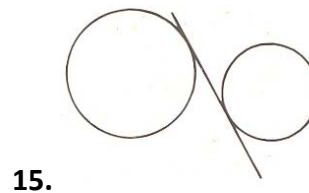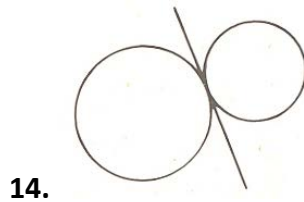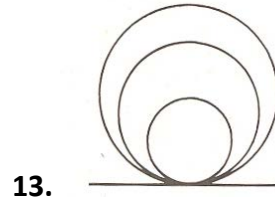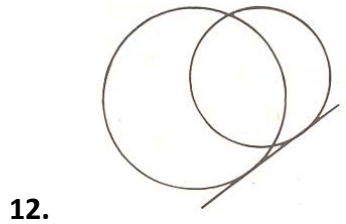**8.** If $OC = 2\sqrt{17}$ and $BC = 5\sqrt{2}$, then $AB =$ _____

9. If $m\angle OCB = 30$ and $OB = 4$, then $OC =$ _____

10. If $m\angle BOC = 60$ and $CB = 6\sqrt{3}$, then $AB =$ _____

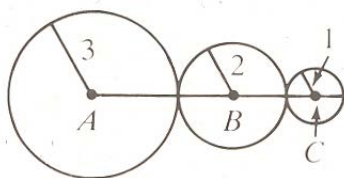**11.** If $m\angle BCD = 70$, then $m\angle CBD = m\angle$ _____ = _____

DIRECTIONS: Determine two things for each diagram:
- A) Are the circles externally tangent, internally tangent, or not tangent at all
- B) Is the line a common external tangent, a common internal tangent, or neither
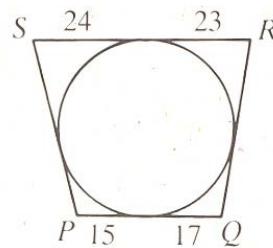
12.

13.

14.

15.

DIRECTIONS: Use your knowledge of radii (if you know one radius, you know them all!) and lengths of external tangents from the same point to help you find the requested lengths.

16. $AC =$ _____

17. $SP =$ _____ $RQ =$ _____

18. $PR =$ _____ $PT =$ _____ $RS =$ _____ $QS =$ _____