Math 30 – Geometry –Test 3 – Fall '12   Name_____
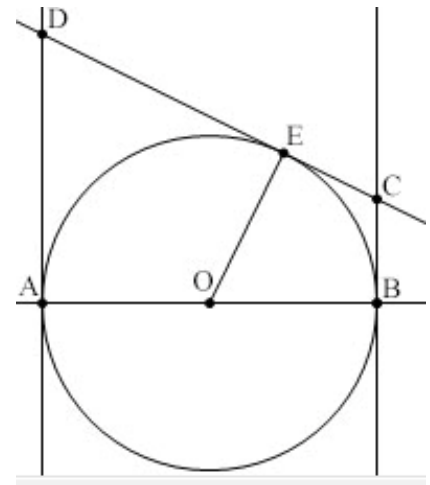Instructions:

Write all responses on separate paper.
Show your work for credit.
Write in complete sentences.

1. If a radius is perpendicular to a chord, prove that it bisects the chord.

2. Prove that the farther a chord is from the center of a circle, the smaller it is.

3. Consider the circle at right with diameter A-O-B and
   tangents $\overleftrightarrow{AD}$ and $\overleftrightarrow{BC}$.

   a. Prove that ABCD is a trapezoid. Use a two-column
       statement/reason style proof. Do not assume any other
       theorem.

   b. Prove that $\angle DCB + \angle CDA = 180°$
                   Type equation here.
   c. Prove that $\angle AOE + \angle ADE = 180°$

   d. Prove that $\angle AOE = \angle BCE$
                   Type equation here.
   e. For what value of $\angle ADE$ is $\angle AOE = 2\angle BOE$? Explain.
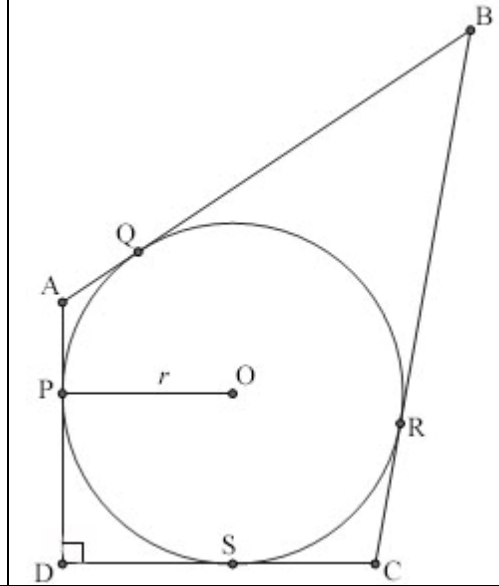

4. In the figure at right, $\triangle ABC$ is circumscribed
    around the circle.

    a. If $CF = 1$ and $AC = 3$, what is CB?

    b. If $CE = BE$ and $AC = 5$, what is
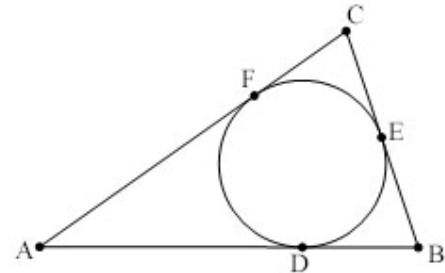
5. Suppose quadrilateral $ABCD$ is circumscribed as shown at right has $BC = 12$ and $AC = 9$.

   a. If $r = 4$, find CD.

   b. If $CD = 5$, find r.

6. Find the circumference of a circle with diameter 22.8 m. Round to the nearest tenth of a meter.

7. If ray PQ and ray PR are two tangents to a circle at points A and B from a common point P outside the circle and $PQ = 35$ yd, find PR.

8. Quadrilateral $ABCD$ is inscribed in a circle with $\angle B$ opposite $\angle D$. If $m\angle C=75°$, find $m\angle A$.

9. What is the area of a circle if it has a circumference of 22π meters?

For problems 10-12 refer to the figure at right.

10. If $m\angle 1 < m\angle 2$, what is the relationship between $\widehat{PQ}$ and $\widehat{RS}$?

11. If $m\widehat{PQ} < m\widehat{RS}$, which is closer to the center O, $\overline{PQ}$ or $\overline{RS}$?

12. $m\angle 1 < m\angle 2$, what is the relationship between PQ and RS ?
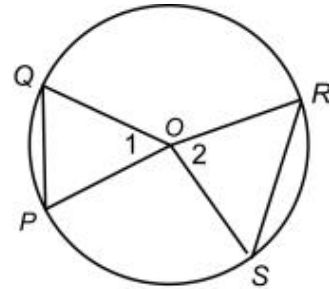
13. Determine the locus of points. All points in a triangle shaped grassy area where a goat could be staked and feed on all the grass while requiring the shortest possible rope.
    (a) one point, the in-center of the triangle
    (b) one point, the centroid of the triangle
    (c) one point, the orthocenter of the triangle
    (d) one point, the circumcenter of the triangle