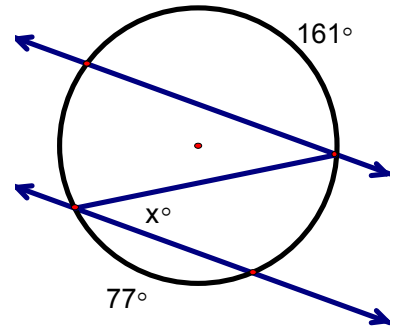


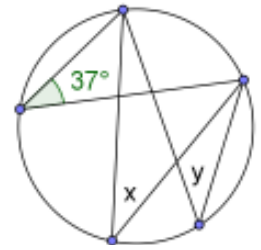
More Motivational Problems on Circles!

1. We have seen that an inscribed angle is half the measure of the arc that it intercepts. Use that information to find the missing angles and arcs in the following diagram. You may assume the lines are parallel.



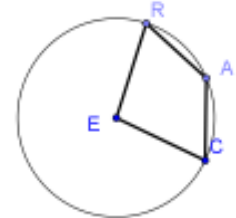
2. If two chords are the same distance from the center of a circle (remember that distance means perpendicular distance) then what do you think must be true about the chords? Try to prove your conjecture.
3. A triangle ABC is inscribed in a circle. Given that AB is a 40-degree arc and $\angle ABC = 50^\circ$, find the sizes of the other arcs and angles in the figure. Draw a detailed diagram before you start.

4. Find the values of x and y in the following diagram. Write a sentence justifying your answer.



5. A chord 6 cm long is 2 cm from the center of a circle. How long is a chord that is 1 cm from the center of the same circle? Justify your answer.

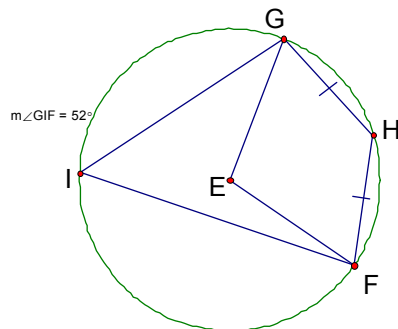
6. The figure at the right shows points C, A and R marked on a circle centered at E, so that chords CA and AR have the same length and so that major arc CR is a 260 degree arc. Find the angles of quadrilateral CARE. What is special about the sizes of angles CAR and ACE?



7. Two circles of radius 10 cm are drawn so that their centers are 12 cm apart. The two points of intersection determine a segment called the *common chord* of the two circles. Draw a detailed diagram of what this looks like and then find the length of the common chord.

8. Points E, W and S are marked on a circle whose center is N. In quadrilateral NEWS, angles S and W are found to be 54 and 113 degrees respectively. What are the other two angles?

9. In the following circle centered at E, find the measure of angle HGE:



10. When two circles have a common chord, their center and the endpoints of the common chord form a special quadrilateral. What kind is it? Does it depend on the circles? What special property do the diagonals have?
11. A regular hexagon has perimeter 36, find its area.
12. A quadrilateral SPAM is inscribed in a circle such that $\angle SPA = 110^\circ$. What is the size of angle $\angle AMS$? Would your answer change if M were replaced by a different point on major arc SA?
13. A 20 inch chord is drawn in a circle with a 12 inch radius. What is the angular size of the minor arc of the chord (in other words what is the measure of the central angle of that chord). Now, what is the length of the arc to the nearest tenth of an inch?