

Relationships among Central Angles, Arcs, and Chords  
Day 2 Student Task

5. Use a compass to construct a circle on an unlined sheet of paper. Label the center of your circle.
    - a. Draw any chord, other than a diameter, on your circle. Use your compass and a straightedge to construct a segment that represents the distance from the center of your circle to the chord. What is the relationship between the chord and the segment representing this distance?
    - b. Mary made the following conjecture: If two chords of a circle are the same distance from the center of the circle, the chords are congruent. Mary is correct. Use what you learned in Item 5a to help Mary prove her conjecture.
    - c. State the converse of Mary's conjecture and prove that it is true.
    - d. Write Mary's conjecture and its converse as a biconditional statement.
    - e. When a conjecture has been proven, it can be stated as a theorem. Write and illustrate this theorem in your *Circle Book*.
  6. Ralph made the following conjecture: A radius perpendicular to a chord bisects the chord.
    - a. Use your construction from Item 5a to help you prove that Ralph's conjecture and the converse are true.
    - b. Write Ralph's conjecture and its converse as a biconditional statement and illustrate it in your *Circle Book*.
    - c. Ralph also believes that a radius perpendicular to a chord bisects the arc intercepted by the chord. Is this true? How do you know?
  7. Tevante examined his construction and his partner's construction. He believes that *any* line that is a perpendicular bisector of a chord of a circle must also contain the center of the circle. Is he right? How do you know?
  8. An investigator working for the Georgia Bureau of Investigation's crime lab has uncovered a jagged piece of a circular glass plate believed to have been used as a murder weapon. She needs to know the diameter of the plate. How might you use the information you learned in problem 7 to help determine the diameter of the circular plate?
- Use a compass, a straightedge, and a ruler to illustrate your answer.