**Activity 5.2.4 Radii and Chords**

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| **Definitions*** A **chord** of a circle is a geometric line segment whose endpoints both lie on the circle. *Not all chords are the same length*
* A **diameter** of a circle is any chord that passes through the center of the circle. *All diameters in the same circle are equal in length.*
* The **radius** of the circle is a line segment in which one endpoint is the center of the circle and the other endpoint is on the circle. *All radii of the same circle are equal in length*.
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| In the picture to the right, point *C* is the center of the circle. Use circle *C* to answer the following questions.1. Name 2 chords drawn in the circle
2. Name 1 diameter drawn in the circle
3. Name 6 radii in the circle *(not all are drawn)*
4. Name 6 segments that are congruent to each other.
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**For Questions 5 through 9 you will need a compass and straightedge.**



1. On the grid provided to the right, draw circle with center *A* whose radius is 5 units.
2. Draw a chord in circle *A*
3. Construct the perpendicular bisector of the chord. *Make sure the perpendicular bisector passes through both sides of the circle.*
4. **Make a conjecture by completing this sentence:** The perpendicular bisector of a chord in a circle passes through the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the circle.
5. Draw a second chord and its perpendicular bisector. Does it also pass through the center of the circle?
6. ** Prove the **Perpendicular Bisector of a Chord Theorem**: The perpendicular bisector of any chord of a circle passes through the center.

**Given**: In circle *C*, is the perpendicular bisector of chord

**Prove**: *C* lies on

 *(Be careful with appearances – you don't know that*  *passes through C, although it certainly appears to. That's what you're trying to prove.)*



11**.** Prove the **Radius Chord Midpoint Theorem:** If a radius of a circle bisects a chord (that is not a diameter), then it is perpendicular to the chord.

**Given:** Circle *C* with radius intersecting chord . *A* is the midpoint of and *A* lies on .

**Prove:**

(Hint: Draw radii and and prove two triangles are congruent.)

12. Prove the **Radius Chord Midpoint Converse:** If a radius of a circle is perpendicular to a chord then it bisects the chord.

**Given:** Circle *C* with radius perpendicular to chord at *A.*

**Prove:** *A* is the midpoint of

(Hint: Draw radii and . Then ∆*CEF* is isosceles.)