**Activity 5.2.5b Locating the Center of a Circle using Geogebra**

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| **The Perpendicular Bisector of a Chord Theorem** – The perpendicular bisector of any chord of a circle passes through the center |

**Part 1 – Find the center of the circle.**

1. ***Open a new Geogebra document***
2. ***Draw a circle without the center given.***
* Press the down-arrow button on the bottom right of the circle icon. 
* Click on the option “Circle through 3 Points”

 

* Click three times on the screen to create the three points. Make sure they don’t lie on a line. Otherwise you won’t get a circle.
* You should see a circle.
1. ***Draw a chord on the circle***
* Press the down-arrow button on the bottom right of the line icon. 
* Click on the “Segment” option



* Click two points **on** the circle.
* You should see a chord
1. ***Draw the perpendicular bisector of the chord***
* Press the down-arrow button on the perpendicular icon. 
* Click on the “Perpendicular Bisector” option



* Click anywhere on the chord.
* You should see a perpendicular bisector.
* *(According to the perpendicular bisector of a chord theorem, this line passes through the center however you don’t know exactly where on this line is the center of the circle.)*
1. ***Draw a second chord on the circle that is not parallel to the first.*** *Follow the direction from Step 3 to complete this.*
2. ***Draw the perpendicular bisector of the second chord*** *Follow the direction from Step 4 to complete this.*
* *(According to the perpendicular bisector of a chord theorem, this line passes through the center of the circle as well!)*
1. ***Plot a point at the center of the circle.***
* Press the down-arrow button on the Point icon*.* 
* Click on the “Intersect” option



* Click once on each of the perpendicular bisectors.
* **The result is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Part 2 – Find the diameter of a circle if you are only given an arc.**

1. ***Open a new Geogebra document***
2. ***Draw a circular arc.***
* Press the down-arrow button on the bottom right of the circle icon. 
* Click on the option “Circumcircular Arc”

 

* Click three times on the screen. You should see an arc.
1. ***Draw 2 chords on the arc.*** *Use the directions for making a segment from PART 1, Step 3 to help.*
* Click two points **on** the arc. *You should see a chord*
* Click two more points **on** the arc. *You should see a second chord*
1. ***Draw the perpendicular bisectors of both chords.*** *Use the directions for making a perpendicular bisector from PART 1, Step 4 to help.*
2. ***Plot a point at the center of the circle.*** *Use the directions for finding an intersection from PART 1, Step 7 to help.*
3. ***Draw the circle to complete the arc .***
* Click on the down-arrow on the arc button. 
* Click on the “Circle with Center through Point”



* Click once on the center and once on a point on the arc.
* You should have a completed circle!
1. ***Find the length of the radius and diameter .***
* Click on the Segment button.
* Draw a segment from the center to any point on the circle. This is the radius.
* Find the length of the radius by clicking the down-arrow of the Angle button 
* Select “Distance or Length” button



* Click on the radius. The length will appear.
* Double the length of the \_\_\_\_\_\_\_\_\_\_\_\_\_ to get the length of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_
1. ***Answer this question:*** *Is there an alternate way to find the length of the diameter?*

**Part 3 – Explain what you learned**

1. Explain why the intersection of the two perpendicular bisectors of two nonparallel chords is always the center of the circle
2. Explain why the chords need to be nonparallel.
3. You have a circular table and want to find its center. How can you do that?
4. Archaeologists find part of a broken plate. Explain how can they determine its diameter?