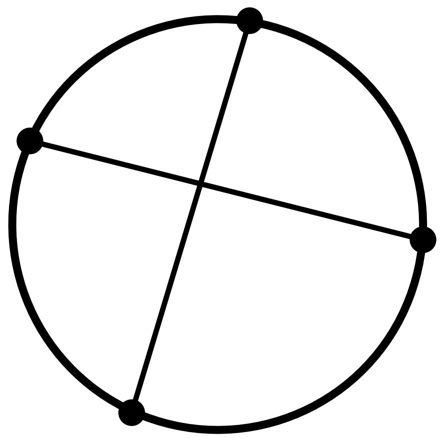
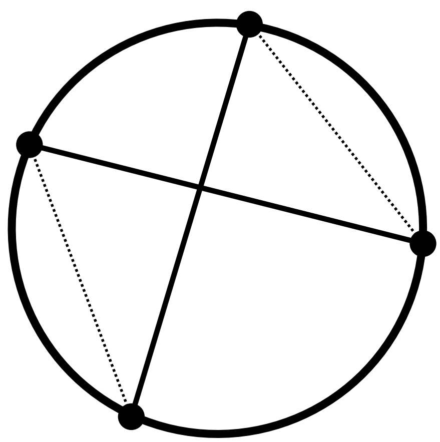
Intersecting Chords of a Circle

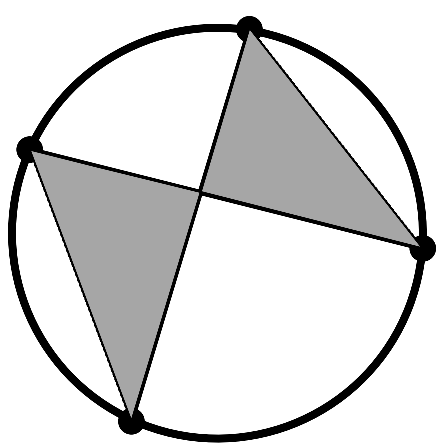
1. Provide groups or pairs of students with circles containing two intersecting chords and cut-out triangles.



2. Ask students*: If you were to connect two pairs of the highlighted points, what would be formed?*



3. Have students match the cut-out triangles to two of the corresponding triangles they have drawn.



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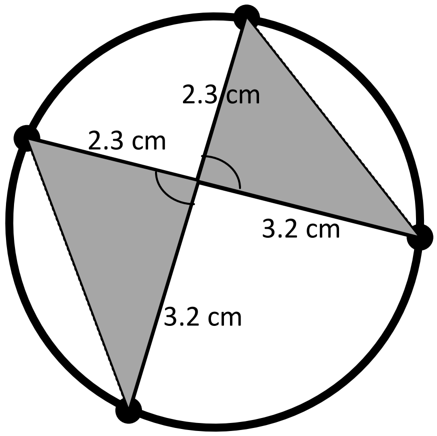
4. Ask students: *What do you notice about these triangles? How do you know? What could we prove about these two triangles? How would you prove it?*

5. Students may measure sides needed to indicate proportionality, (we recommend using centimeters and measuring to the nearest tenth) or they may measure angles. If they measure angles, teachers may need to have them look at the theorem and draw conclusions.



6. *What do we observe?* $\frac{\mathbf{2.3}}{\mathbf{2.3}} = \frac{\mathbf{3.2}}{\mathbf{3.2}}$ The theorem states that the cross products are equal, and the students have proven that for themselves.

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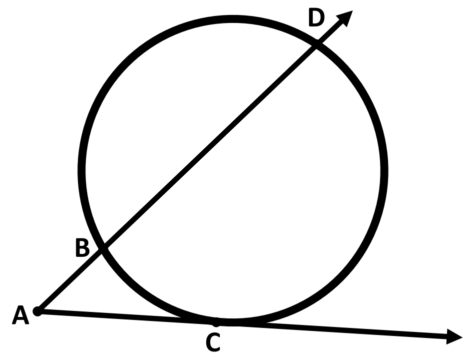
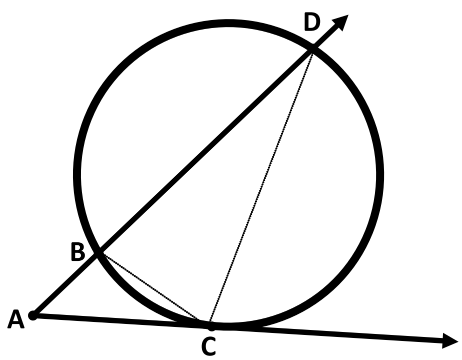
Intersecting Secant and Tangent Lines of a Circle

1. Provide pairs or student groups a circle with an intersecting secant and tangent line.

2. Students should label the highlighted points.



3. Using a straightedge, students need to connect each of the two points that are *not* connected.



4. Using patty paper, have students trace ΔABC and ΔADC. Ask: *What do you notice? How would you prove this?*

5. *What do you notice regarding the sides?* Students may write their ratios*:* $\frac{AB}{AC}=\frac{AC}{AD}=\frac{BC}{CD}$,

or, the teacher may again have students look at the theorem and make connections.

6. Notice what we have derived from the first two equivalent ratios. $(AC)^2 = AB \bullet AD$

Students have made the connection of how/why the theorem works by using prior knowledge of similar triangles.

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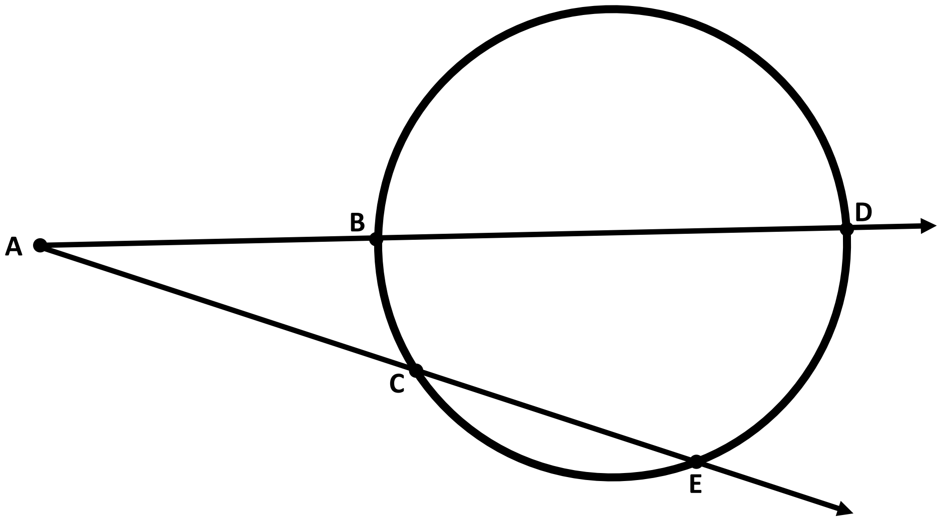
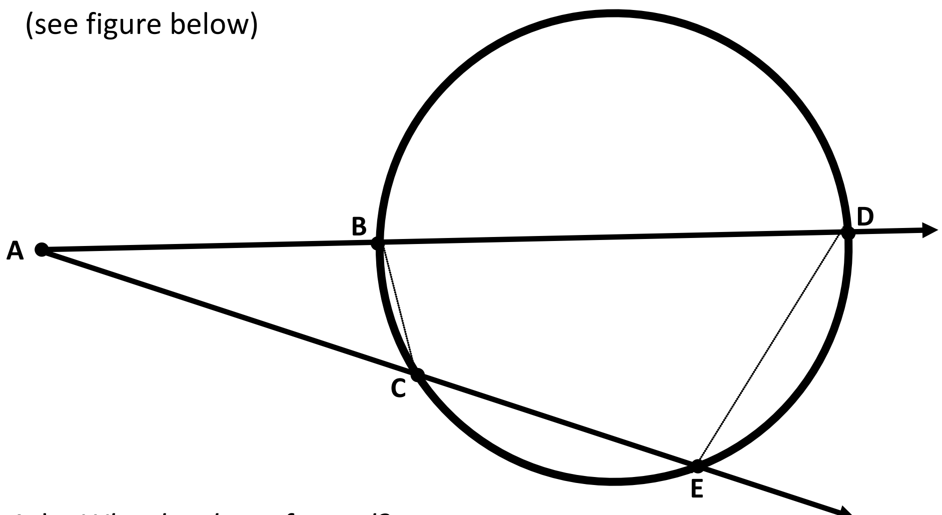
Two Intersecting Secants of a Circle

1. Provide pairs or student groups circles with two intersecting secants.
2. Students should begin by labeling the points of their circle.



3. Using a straightedge, students draw a chord intersecting two of the points.
   (see figure below)



4. Ask: *What has been formed?*

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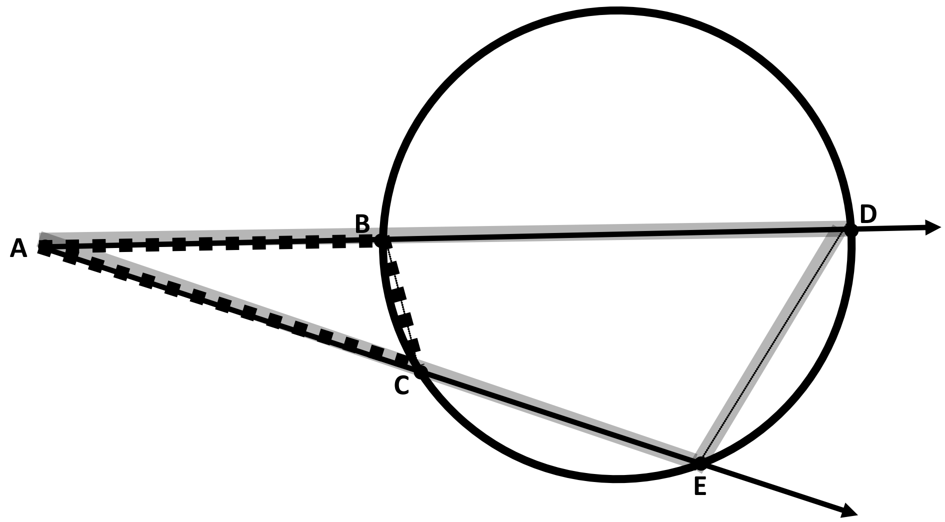
5. Using patty paper, students should trace the two triangles. (use two separate pieces of patty paper) Ask: *What do you notice? How could we prove this?*



6. Have students draw conclusions. They may write the equivalent ratios: $\frac{AD}{AC} = \frac{AE}{AB} = \frac{ED}{BC}$

7. Provide students with the Theorem and allow them to make the connection: $AB \bullet AD = AC \bullet AE$

8. Students will make the connection of why the theorem is valid by applying knowledge of similar triangles.

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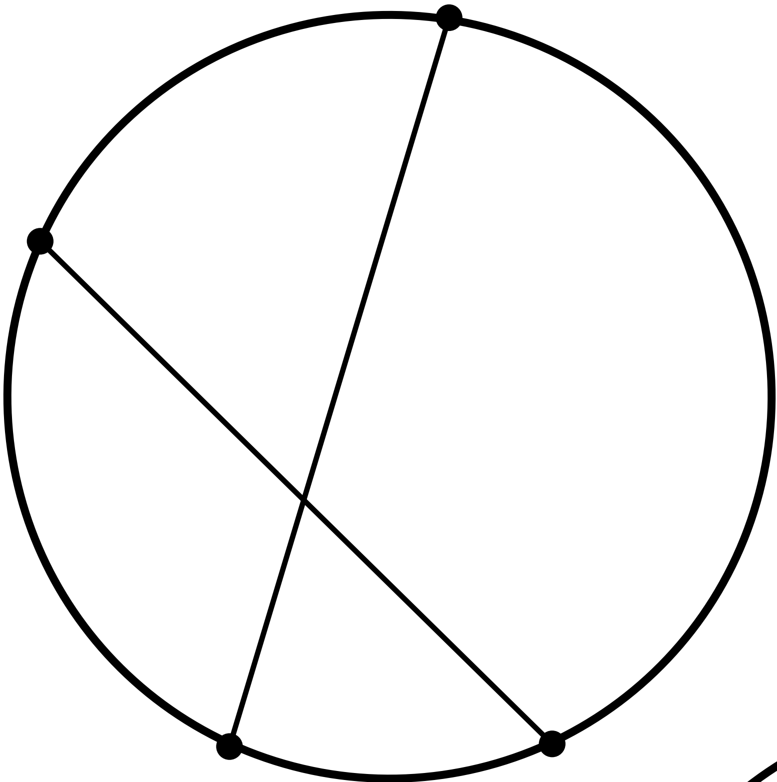

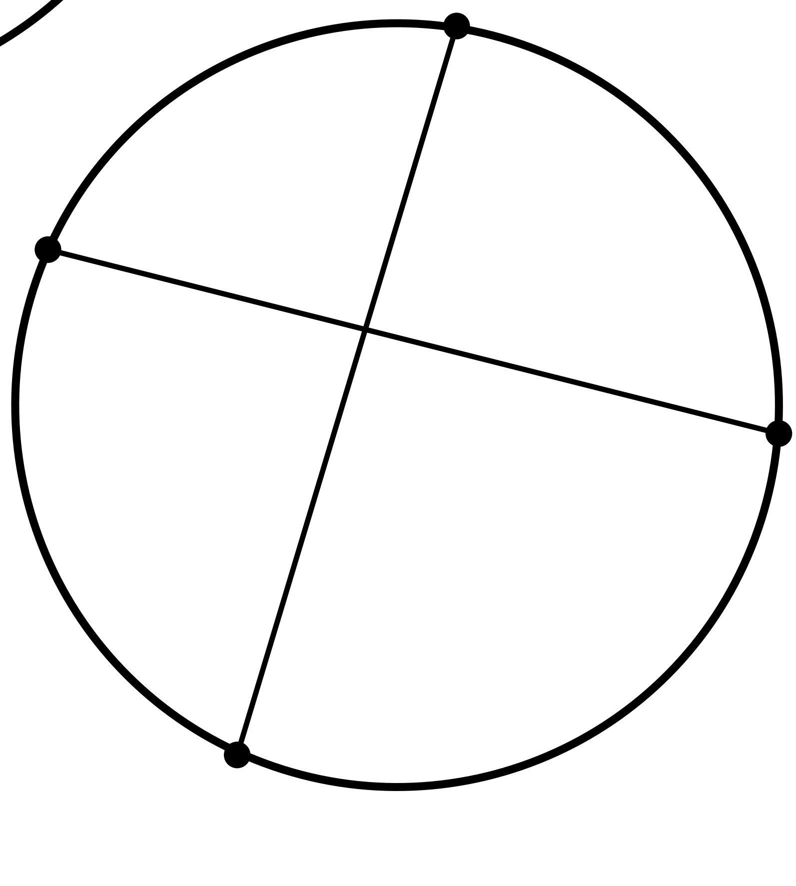

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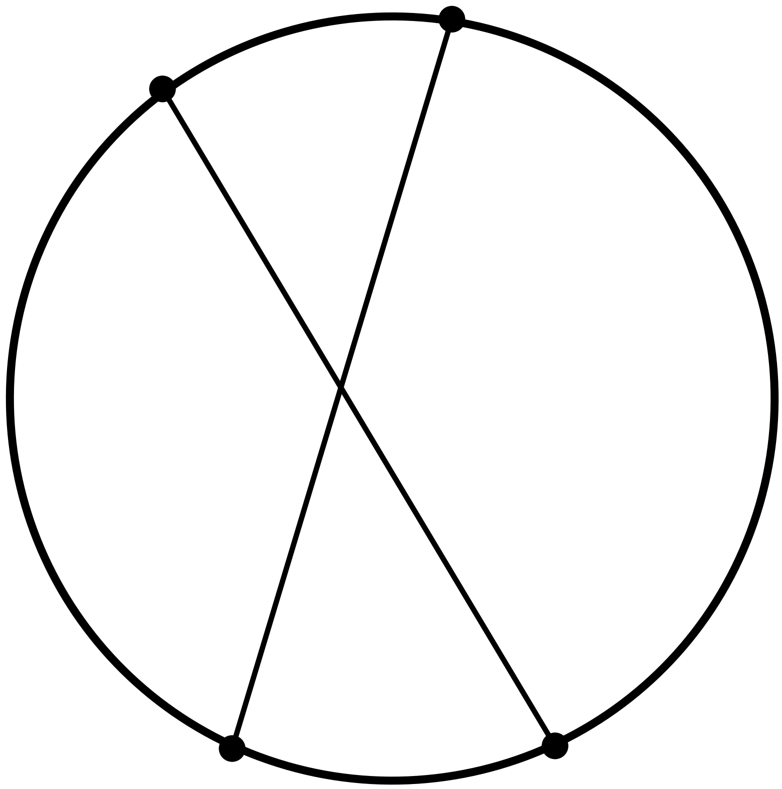

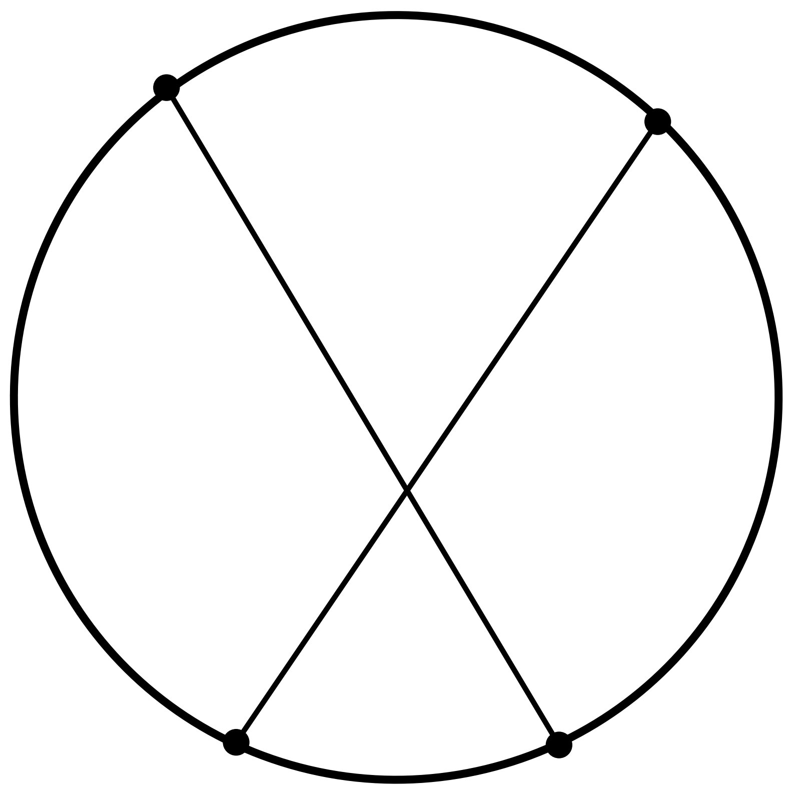

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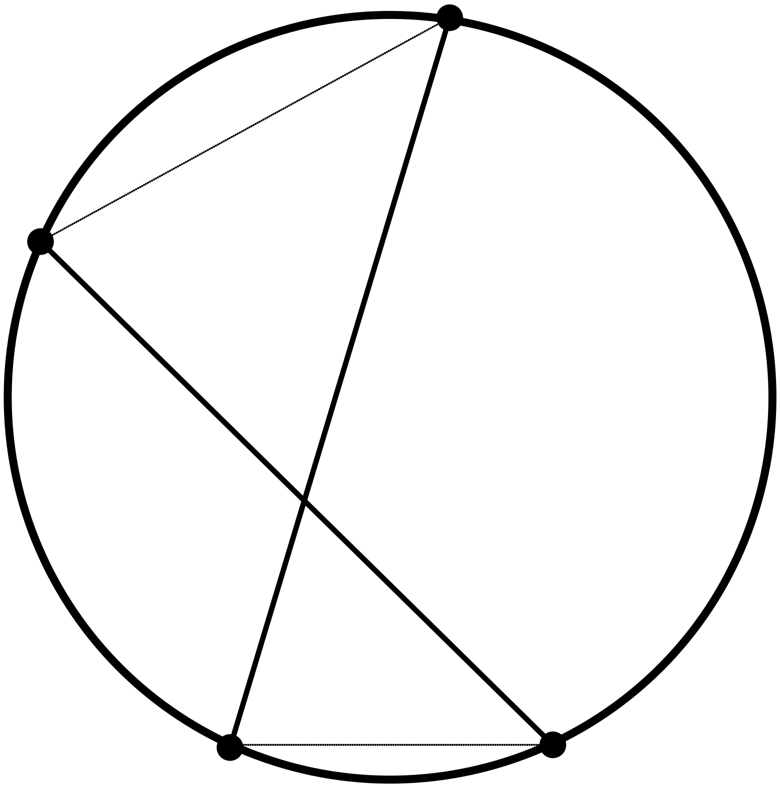

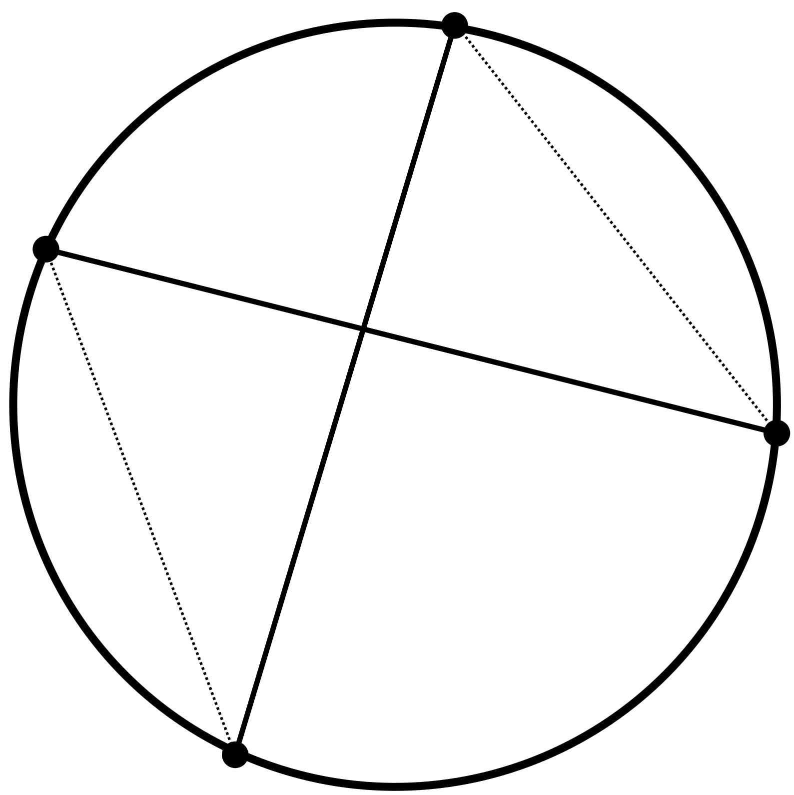

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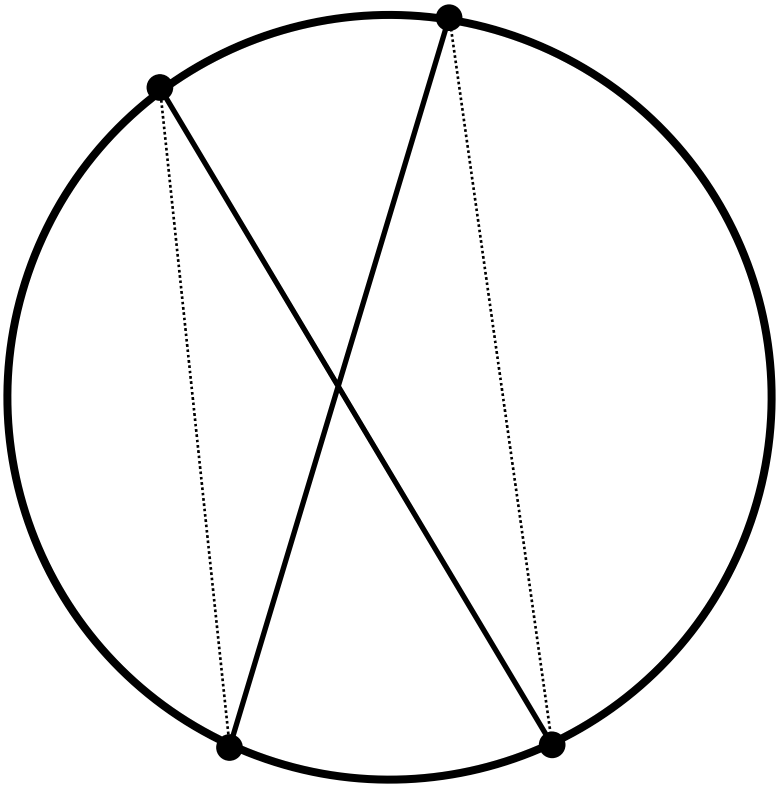

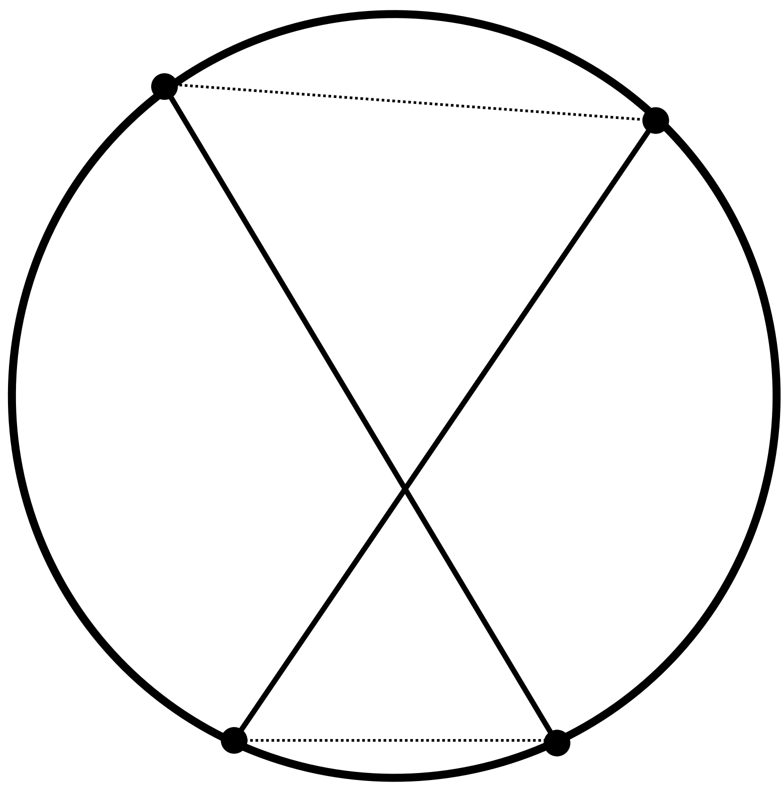

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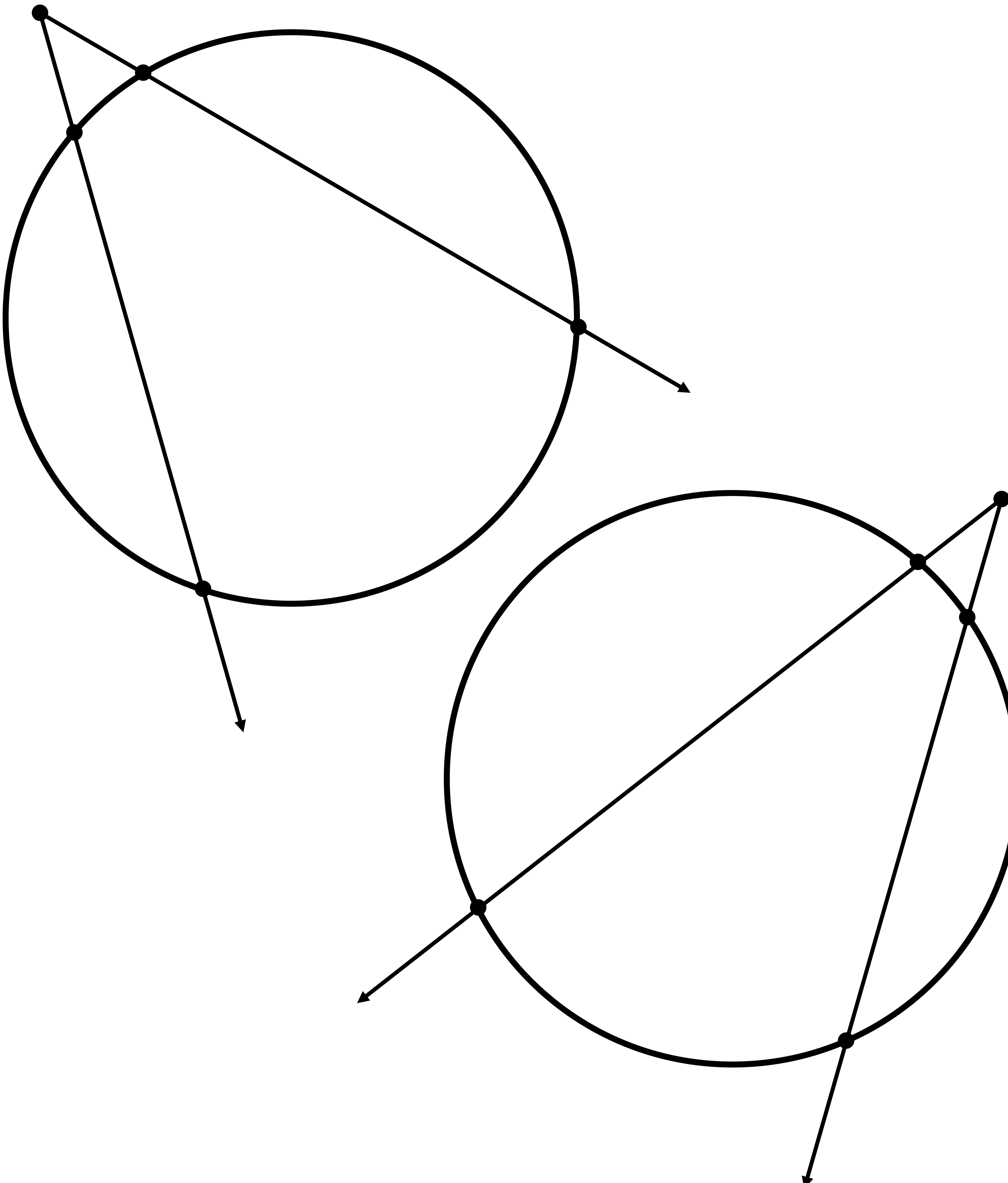

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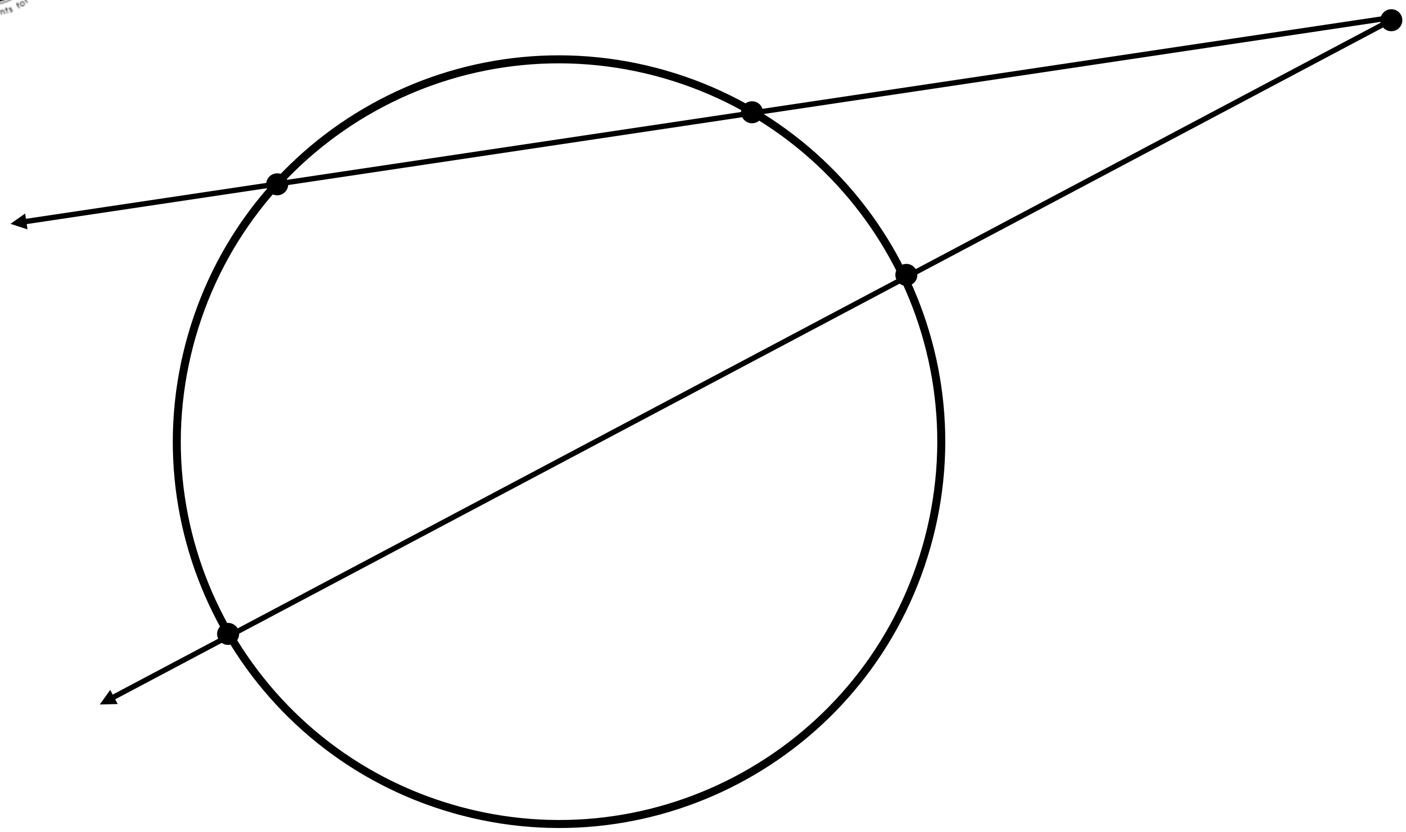

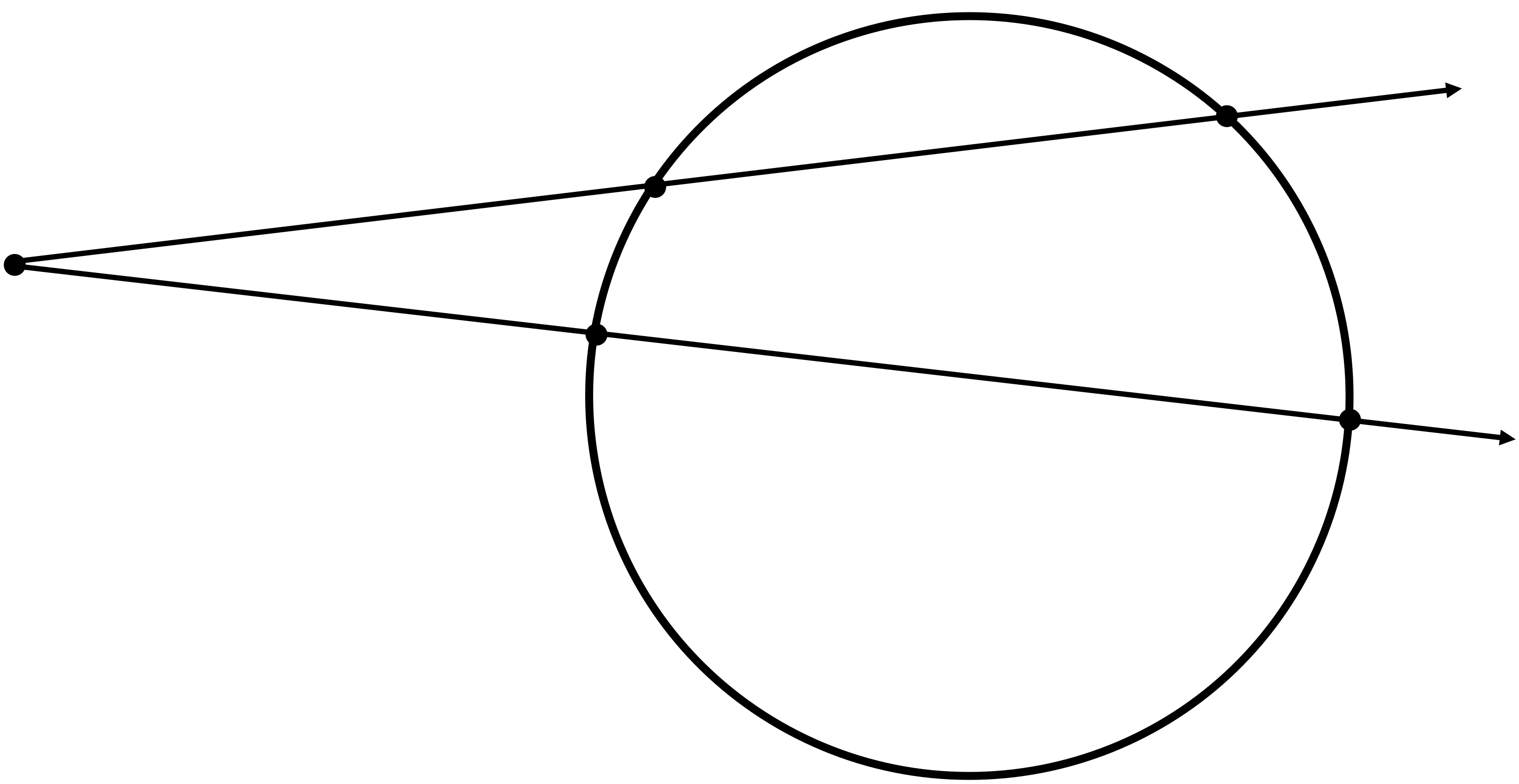

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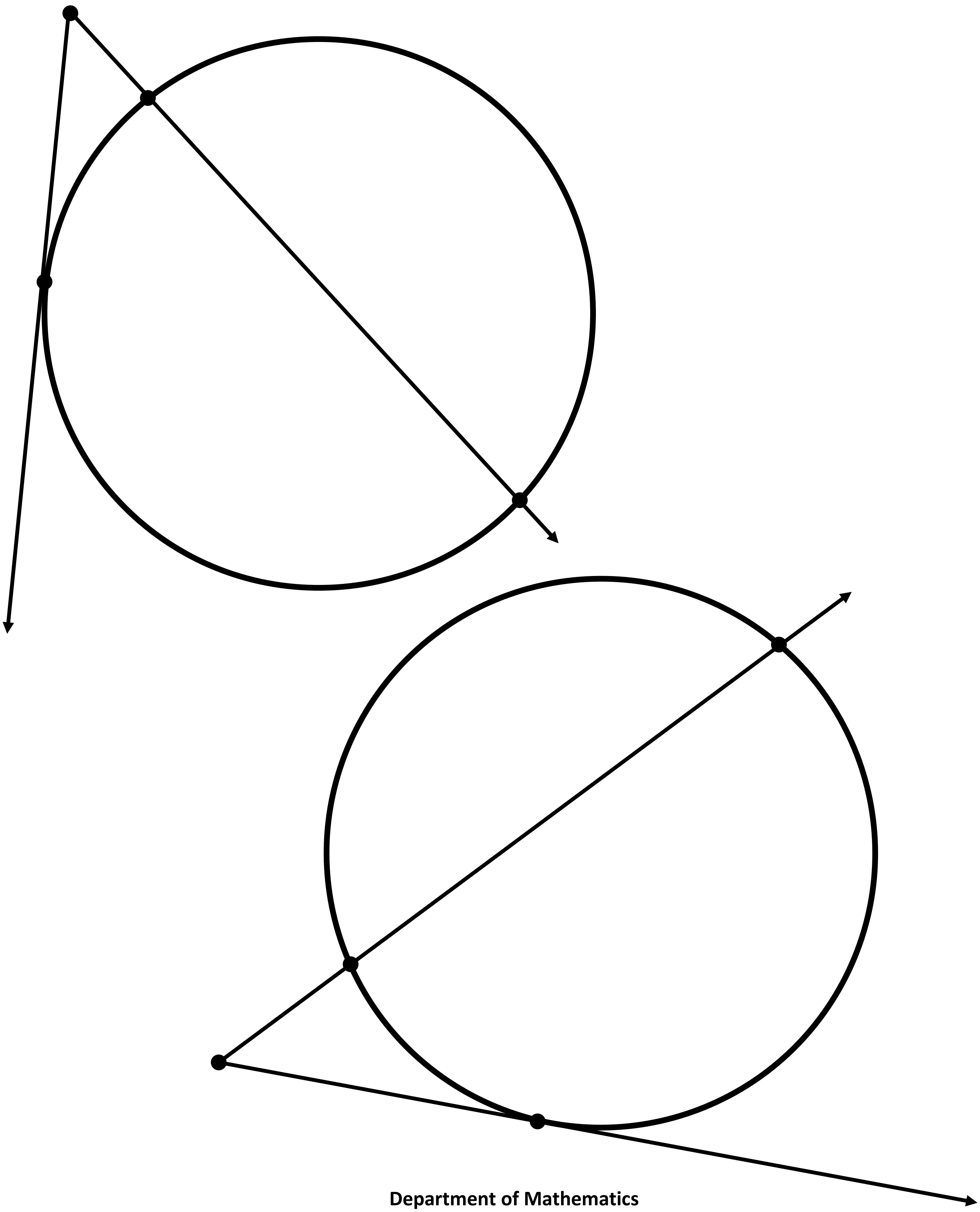

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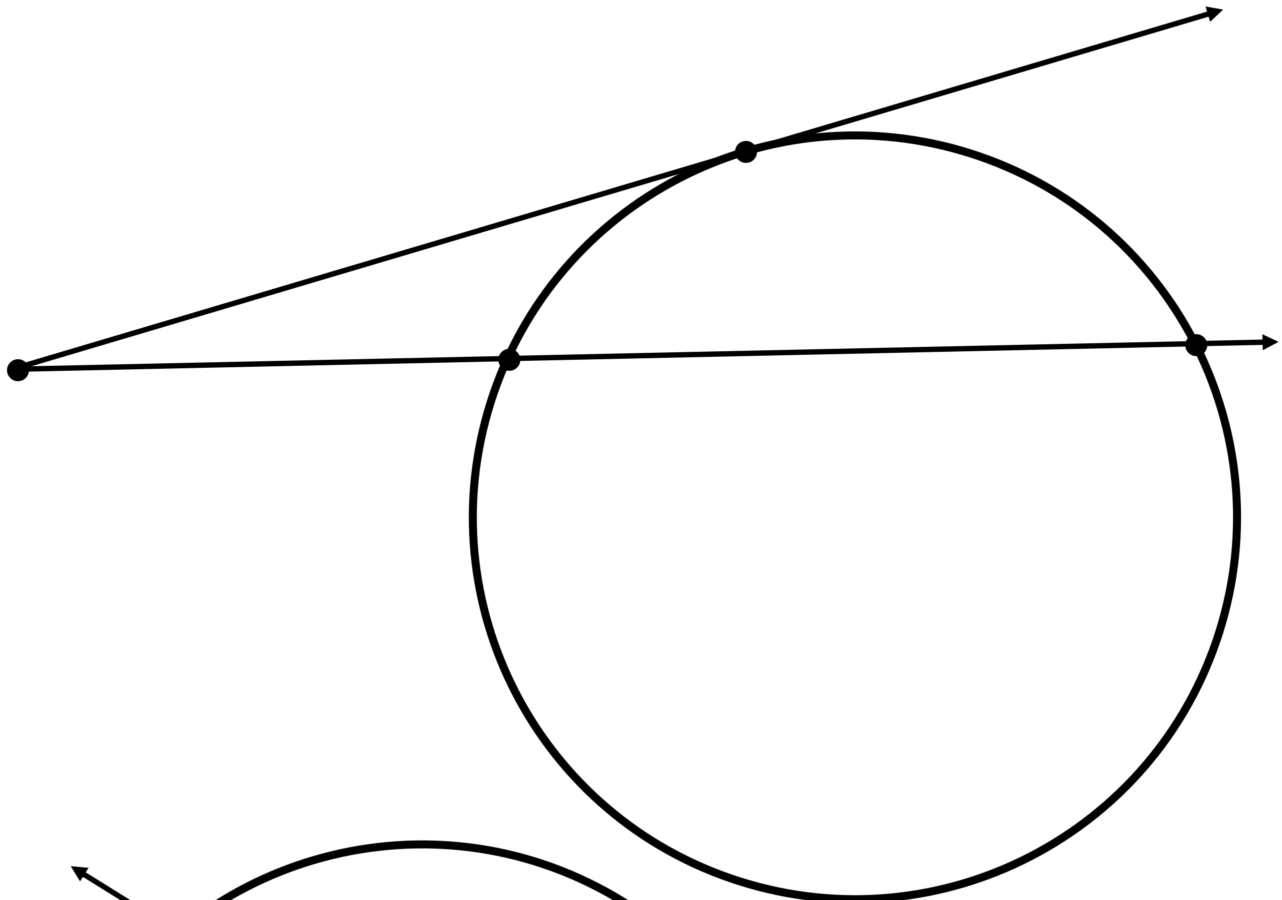

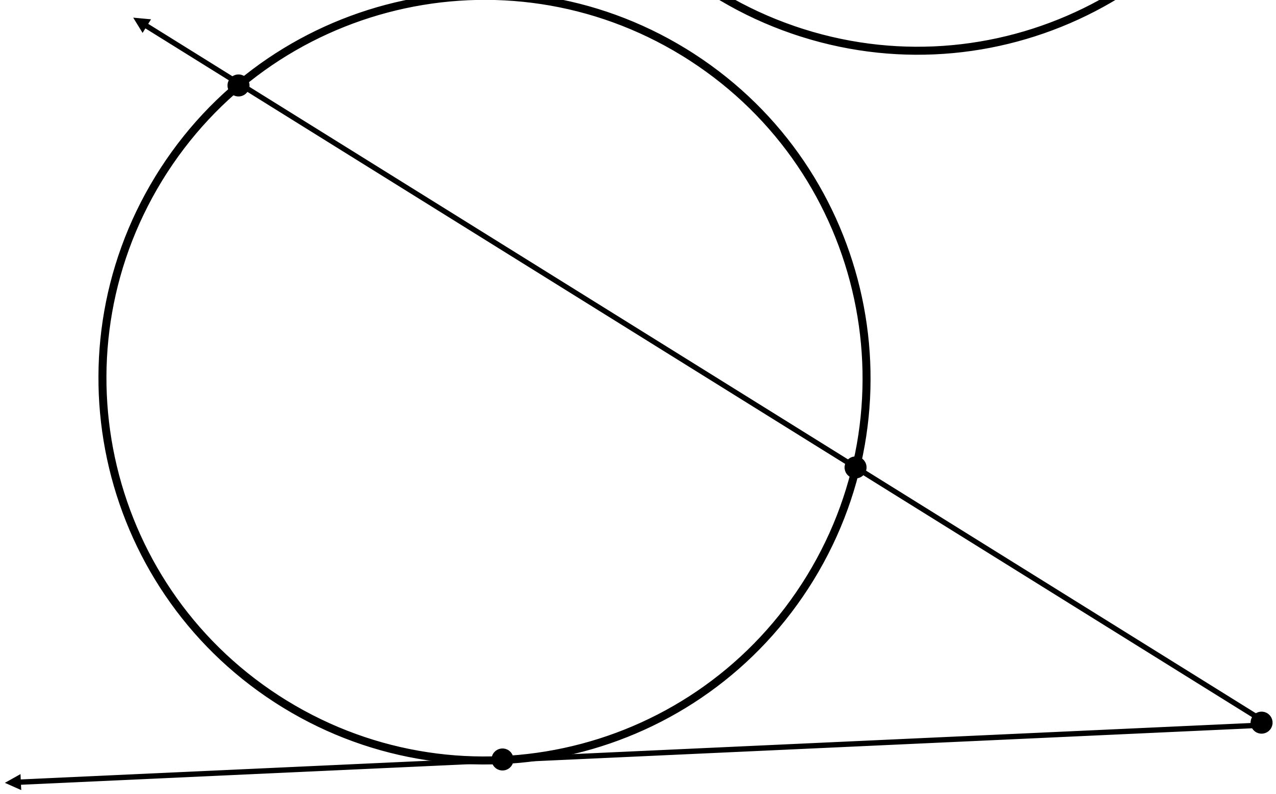

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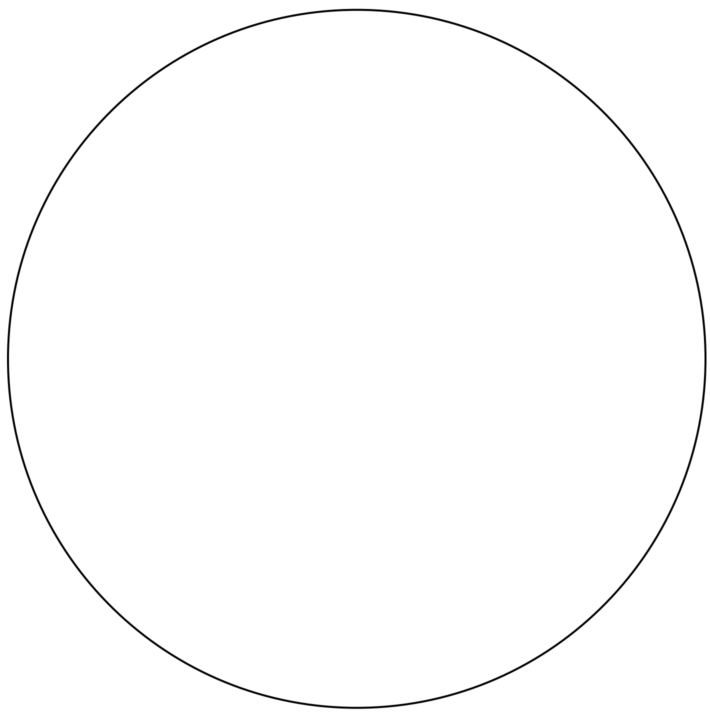
Find the center of the circle



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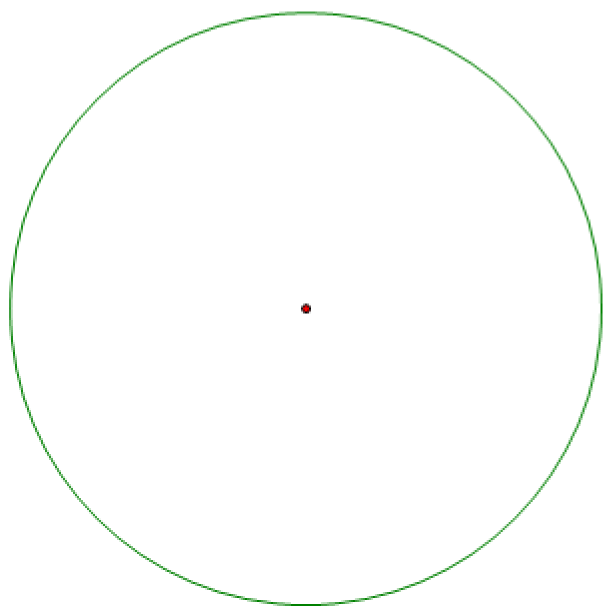
Circle with center



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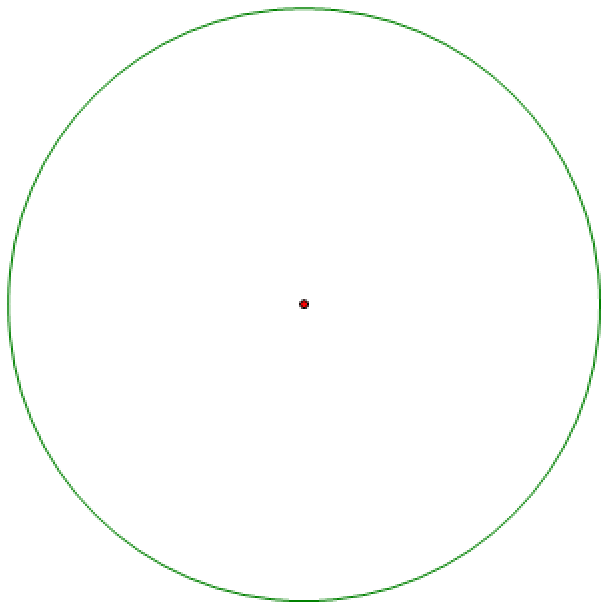
Construct an equilateral triangle inscribed in the circle



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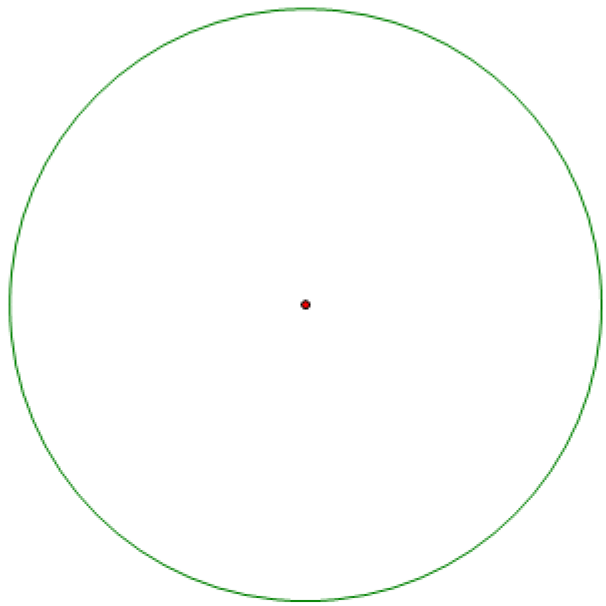
Construct an inscribed square



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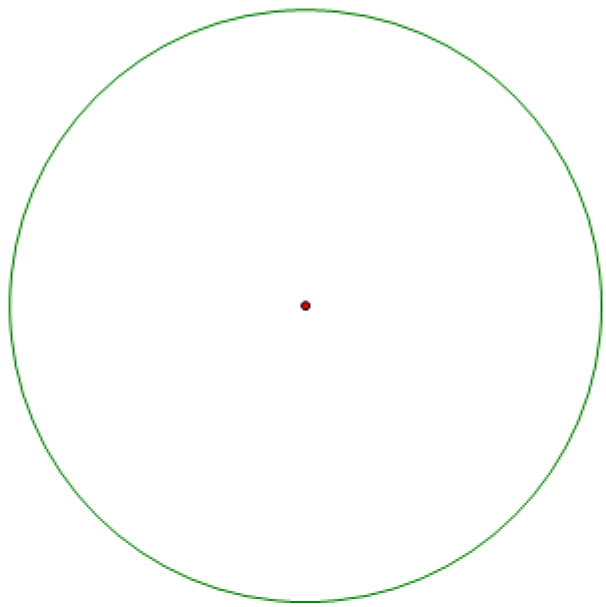
Construct an inscribed hexagon



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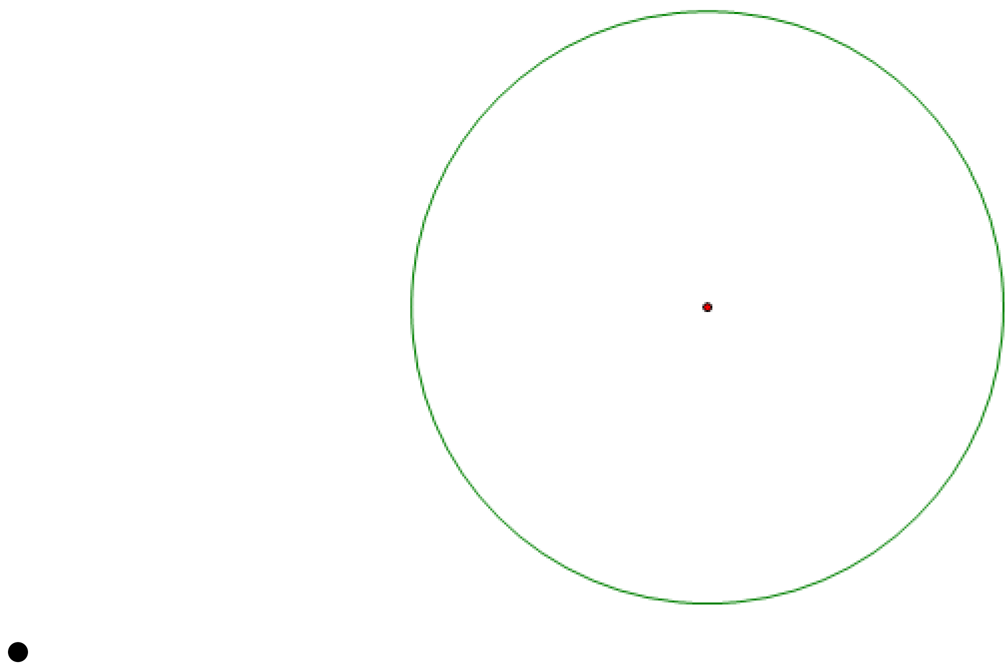
Construct a tangent to the circle passing through an exterior point



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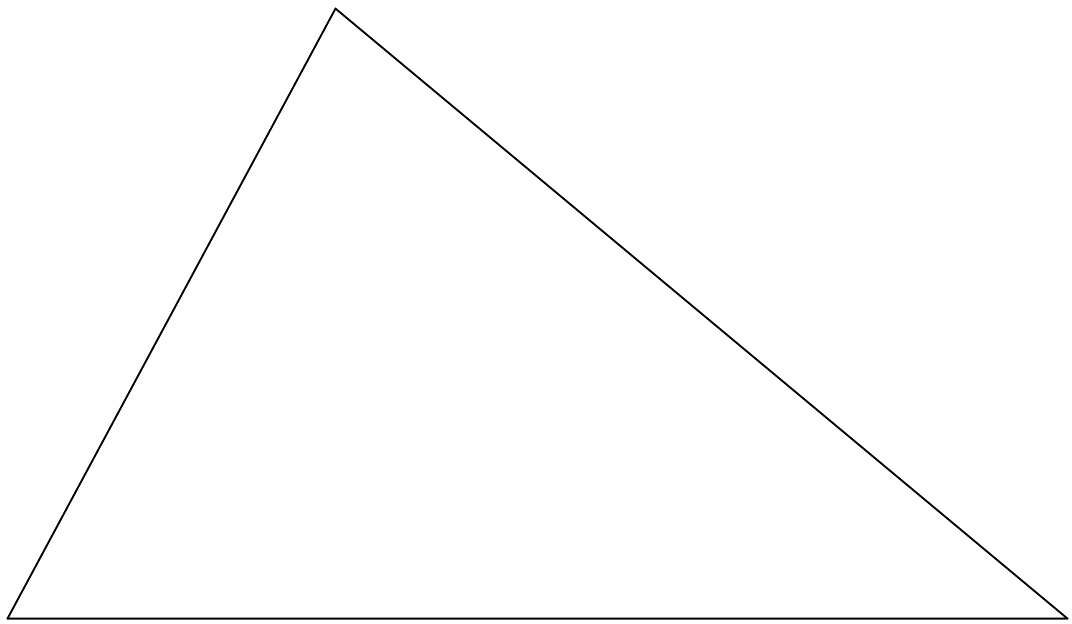
Construct an inscribed circle of the given triangle



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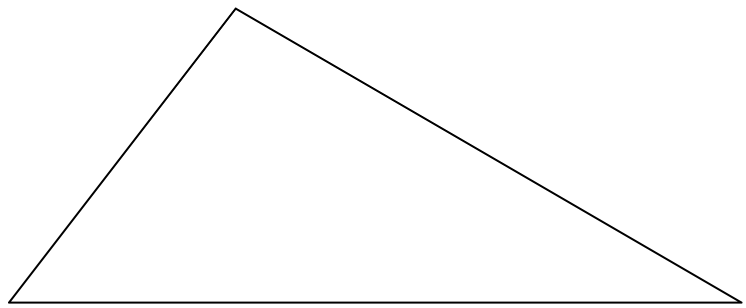
Construct a circumscribed circle of the given triangle



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Circle Construction Application

Your camera has a 90° field of vision and you want to photograph the Robert E. Lee statue on Monument Avenue. You move to a spot where the statue is the only thing captured in your picture, as shown. You want to change your position. Where else can you stand so that you completely capture the statue in your camera's field of vision?

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Circle Construction Activity (option A)

Using the circle and points provided create a design or logo that contains *at least* 3 constructions. Color or decorate your design with colored pencils, leaving your construction marks visible

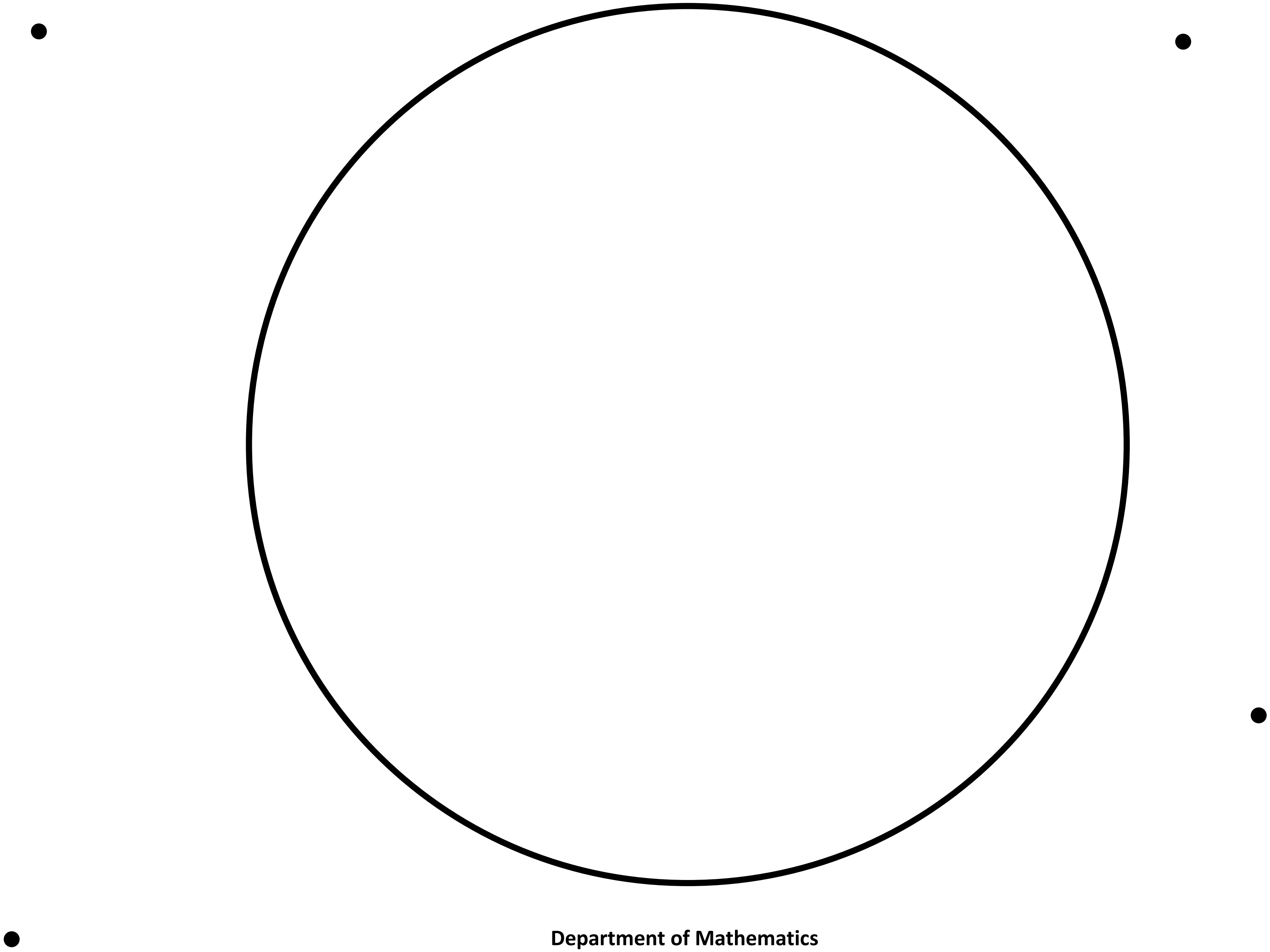
Note: the center of the circle is not provided. It may be needed to perform some of the desired constructions.

Circle Construction Activity (option B)

Using the circle and points provided create a piece of art that contains the following elements.

Note: the center of the circle is not provided. It may be needed to perform some of the desired constructions.

- At least three tangent lines from a point outside the circle to the circle.
- Two sets of two intersecting tangents.
- At least two intersecting secants and tangents.
- An inscribed equilateral triangle.
- The inscribed triangle should contain an inscribed circle.
- Two sets of two intersecting chords.
- Two intersecting secants.
- At least three central angles.
- At least three inscribed angles, two of which are congruent.



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