

Section 1.5 Cabri Jr. Investigation on Perpendicular Bisectors

- Draw a triangle on your screen.
- Construct the perpendicular bisector of each side.
- Investigate the perpendicular bisectors of other triangles by dragging one of the vertices of the triangle.
 - Make a conjecture about the perpendicular bisectors of any triangle based on your observations.
 - Make a conjecture about the perpendicular bisectors of an acute triangle based on your observations.
 - Make a conjecture about the perpendicular bisectors of an obtuse triangle based on your observations.
 - Make a conjecture about the perpendicular bisectors of a right triangle based on your observations.
- Locate the intersection point of the perpendicular bisectors.
- Measure the distance between the intersection point and each of the vertices of the triangle.
- Investigate these distances for other triangles by dragging one of the vertices of the triangle.
 - Make a conjecture about the distances between the intersection points of the perpendicular bisectors and the vertices of any triangle.
 - The intersection point of the perpendicular bisectors is called the *circumcenter* of the triangle. Explain, and demonstrate with a diagram/construction, why this point is called the *circumcenter*.

Section 1.5 Cabri Jr. Angle Bisector Investigation

- Draw a triangle on your screen.
- Construct the angle bisector of each angle.
- Investigate the angle bisectors of other triangles by dragging one of the vertices of the triangle.
- Make a conjecture about the angle bisectors of any triangle based on your observations.
- How is your conjecture about the angle bisectors the same as your conjecture about the perpendicular bisectors of the sides?
- How is your conjecture about the angle bisectors different from your conjecture about the perpendicular bisectors of the sides?
- Locate the intersection point of the angle bisectors.
- Construct a perpendicular from the intersection point to each of the sides. Locate the intersection point of each side and its perpendicular. Use this intersection point to measure the distance from the intersection point of the angle bisectors to each of the sides of the triangle.
- Investigate these distances for other triangles by dragging one of the vertices of the triangle.
- Make a conjecture about the distances between the intersection point of the angle bisectors and the sides of any triangle.
- The intersection point of the angle bisectors is called the *incenter* of the triangle. Explain, and demonstrate with a diagram/construction, why this point is called the *incenter*.

1.5 Applications for the Circumcenter and Incenter of Triangles

1. You are the designer of an amusement park. The owner wants the largest souvenir stand placed in the park so that it is the same distance from the three most popular rides in the park: the Blazing Bisector, the Towering Triangle, and the Sine Wave Splash.
- In the drawing below, locate the position of the souvenir stand that would satisfy the owner.

The Blazing Bisector



The Towering Triangle

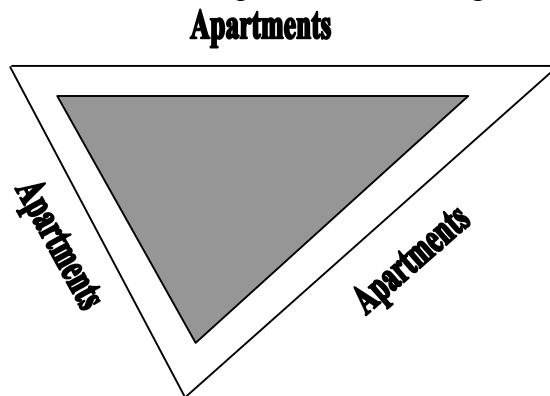


The Sine Wave Splash

- Explain the technique you used to locate the souvenir stand.
- Why do you think the owner wants the stand in this location?

2. You are designing a circular swimming pool for a triangular lawn surrounded by apartment buildings. You want the center of the pool to be equidistant from the three sidewalks.

Locate the center of the pool in the drawing below.



- Explain the technique you used to locate the center of the pool.
- What might be a reason for placing the pool in this location?