

Point of Concurrency and (more) Circumcircle

Definition: When three or more lines (or segments or rays), also known as *concurrent lines*, intersect at the same point, it called the *point of concurrency*.

Examine the *Point of Concurrency* in GSP sketch. (Click on *script view* option of GSP to get details on construction).

Question 1: Generalize what you know about the point of concurrency of the perpendicular bisectors of an acute triangle, a right triangle, and an obtuse triangle.

Now we will explore a characteristic of the point of concurrency of the angle bisectors of a triangle. Let's go back to our triangle in the GSP. We will measure the distance between the point of concurrency and the vertices of the triangle. First we must put a point at the point of concurrency. Next we will measure the distance between the point of concurrency and each of the three vertices.

Question 2: What can you note about the distances from the point of concurrency of the perpendicular bisectors and the vertices of the triangle?

Definition: The *circumcircle* is a triangle's circumscribed circle, that is, the unique circle that passes through each of the triangle's three vertices. The center of the circle is called the *circumcenter* and the radius is called the *circumradius*.

Examine the *Circumcircle* in GSP sketch. (Click on *script view* option of GSP to get details on construction).

Question 3: Why do you think this point of concurrency is called the circumcenter? (Hint: Look at your drawings from Questions 1 and 2.).

Question 4: Fill in the blanks

Circumcenter Theorem - The three _____ of a triangle meet at the _____, which is a point of concurrency that is _____ to the _____ of the triangle.