

# Chapter 6

## Relationships Within Triangles

6.1 Perpendicular and Angle Bisectors

**6.2 Bisectors of Triangles**

6.3 Medians and Altitudes of Triangles

6.4 The Triangle Midsegment Theorem

6.5 Indirect Proof and Inequalities in One Triangle

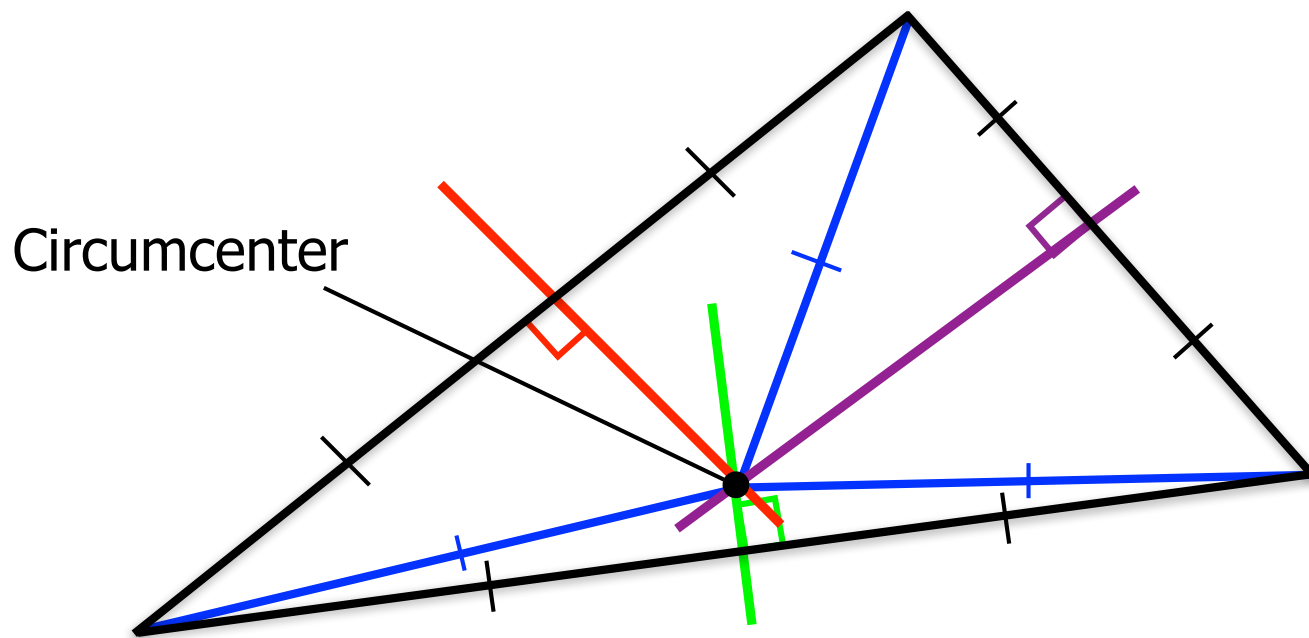
6.6 Inequalities in Two Triangles



# 6.2 Bisectors of Triangles

Perpendicular bisectors create:

**Circumcenter**

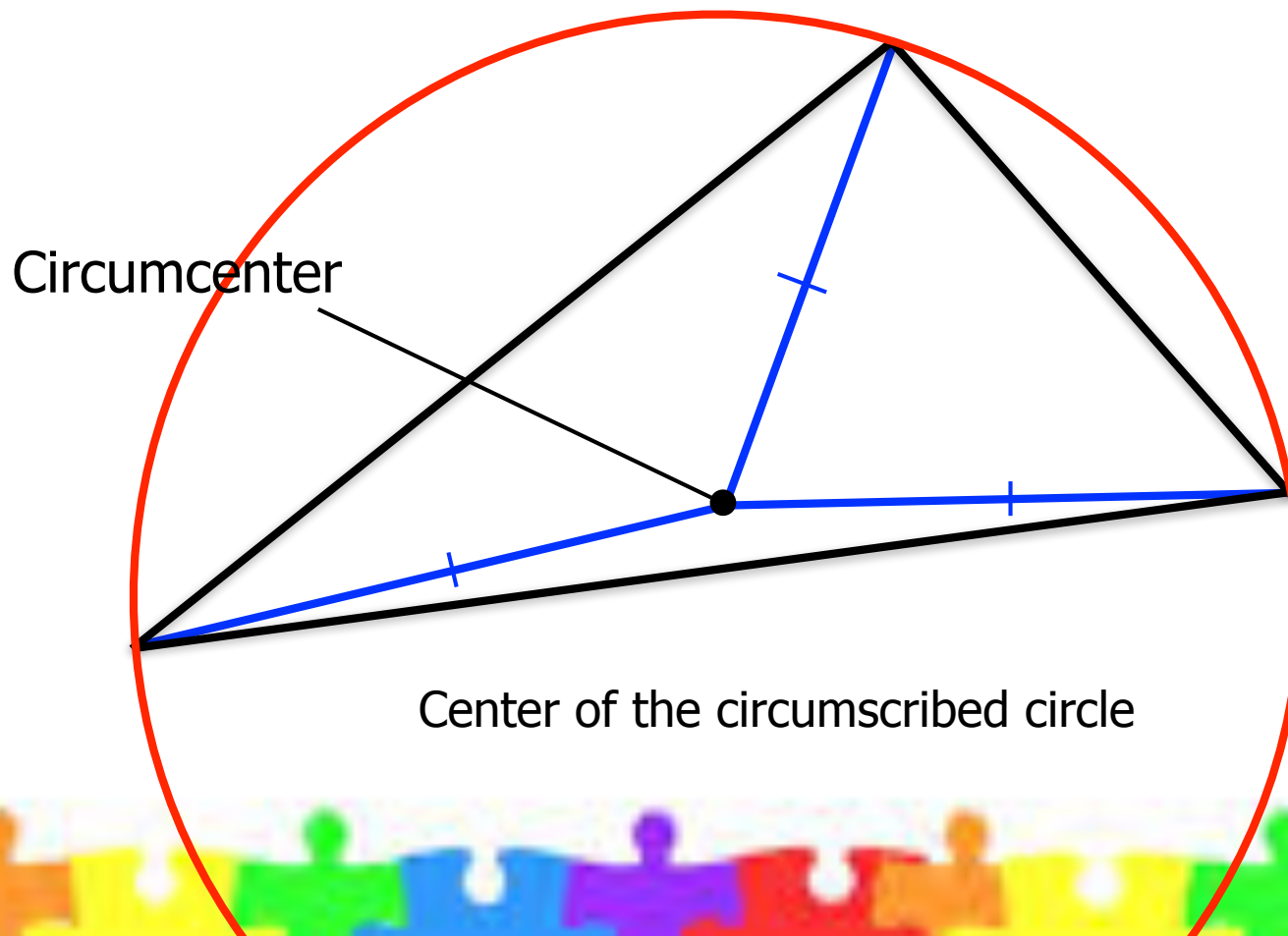


Equidistant from the Vertices

# 6.2 Bisectors of Triangles

Perpendicular bisectors create:

**Circumcenter**

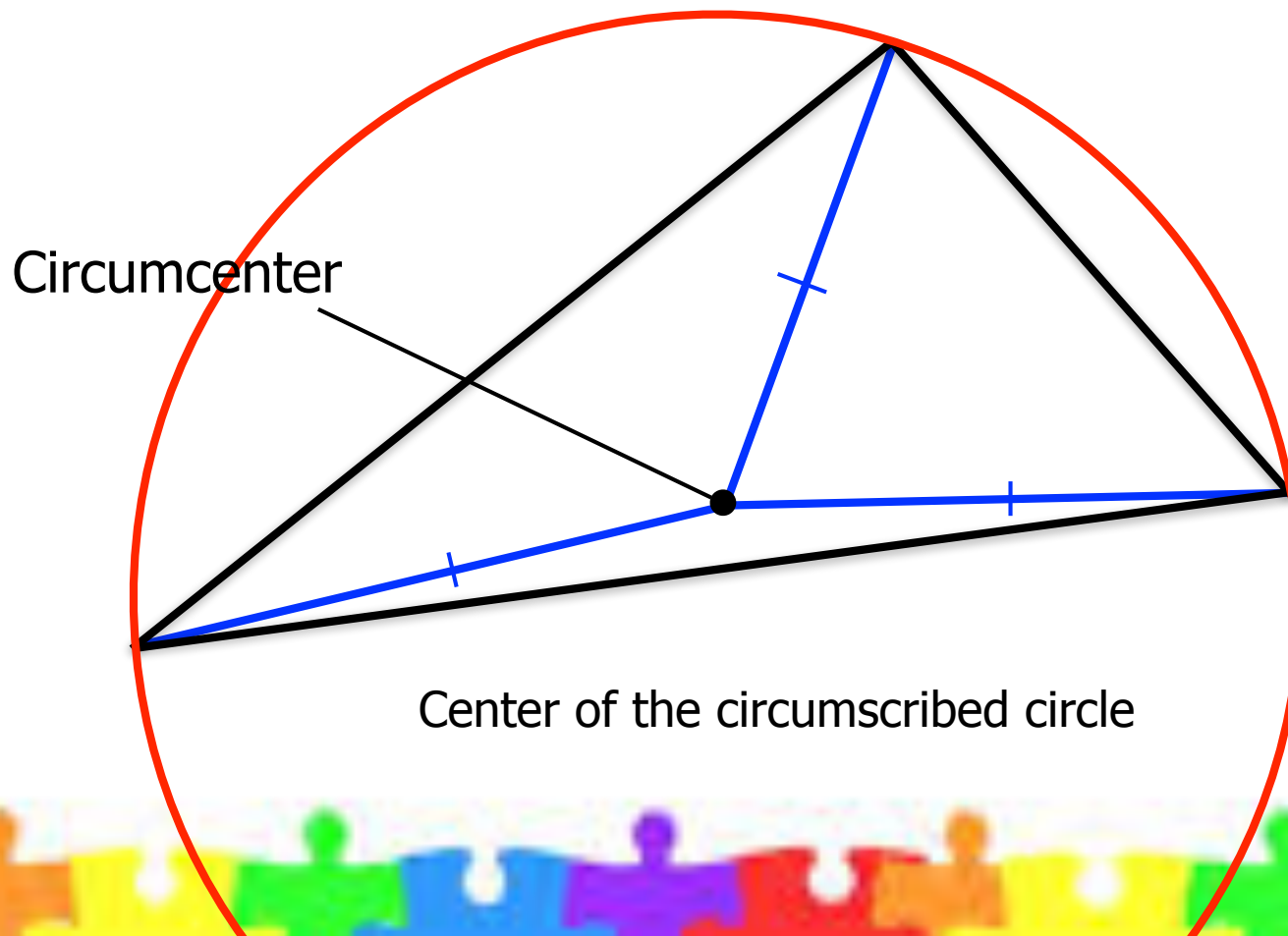


# 6.2 Bisectors of Triangles

## Theorem

### Circumcenter Theorem

The circumcenter of a triangle is equidistant from the vertices of the triangle.



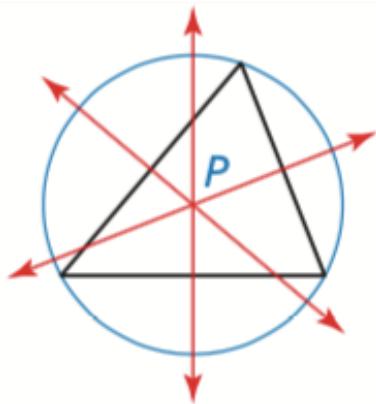
# 6.2 Bisectors of Triangles

## Theorem

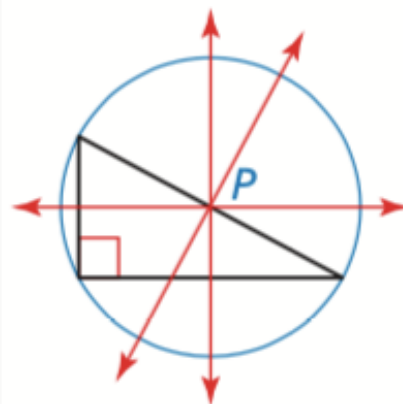
### Circumcenter Theorem

The circumcenter of a triangle is equidistant from the vertices of the triangle.

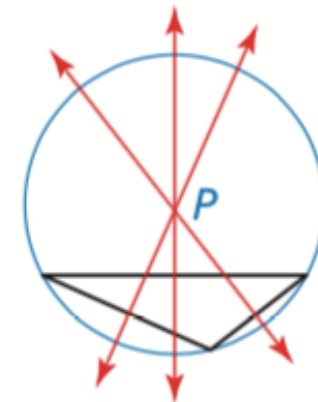
## Locations of circumcenter (P)



Acute triangle  
 $P$  is inside triangle.



Right triangle  
 $P$  is on triangle.



Obtuse triangle  
 $P$  is outside triangle.

# 6.2 Bisectors of Triangles

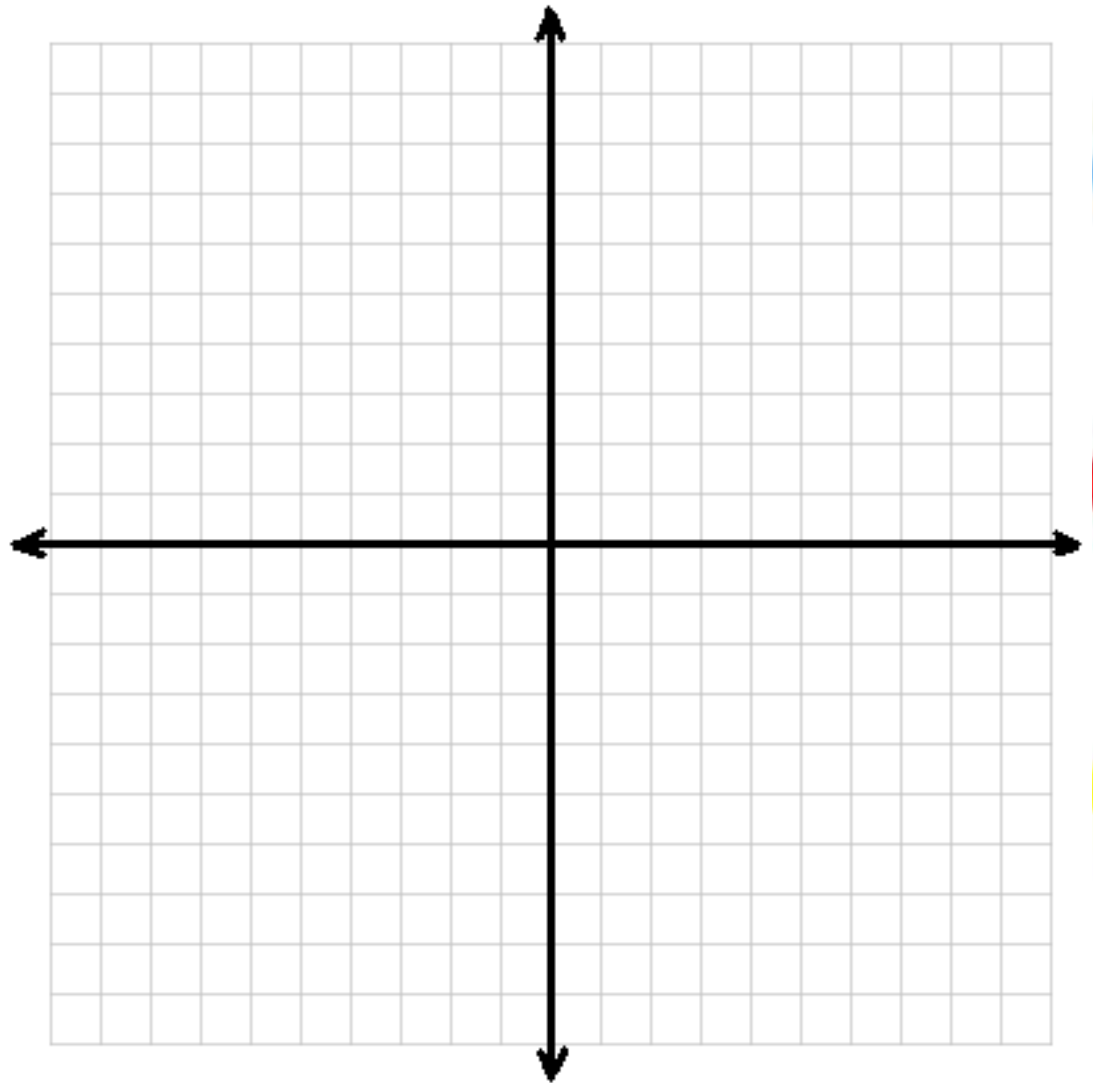
## Practice:

Find the coordinate of the circumcenter of the triangle with the vertices:

$$O(0, -9)$$

$$Y(0, 0)$$

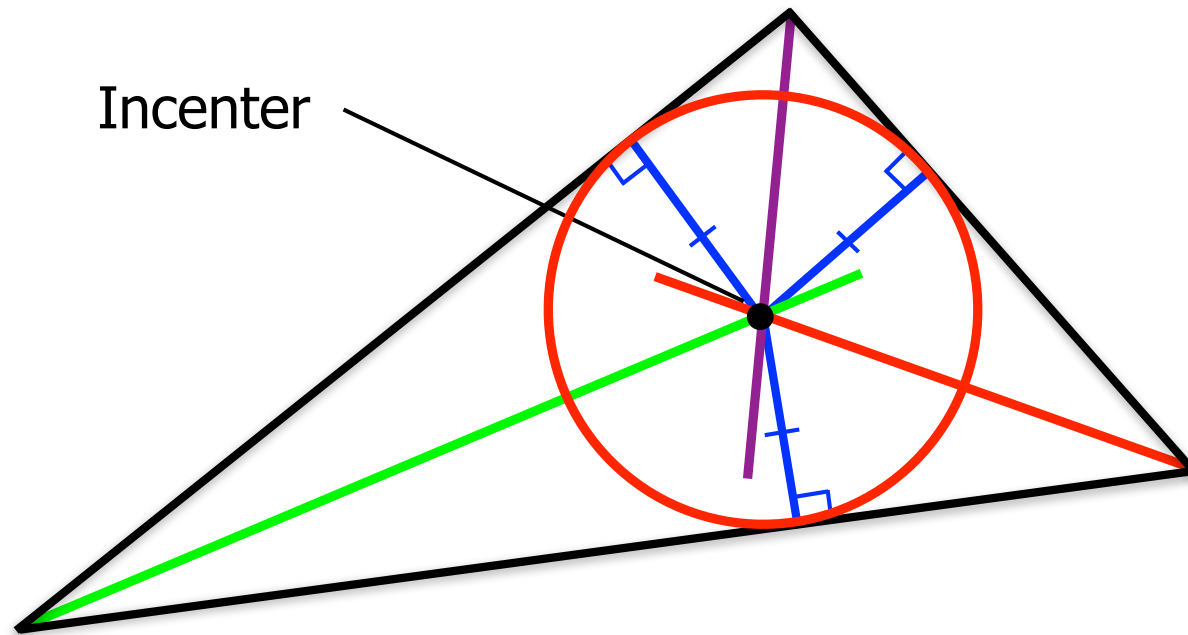
$$Z(8, 0)$$



# 6.2 Bisectors of Triangles

Angle bisectors create:

**Incenter**



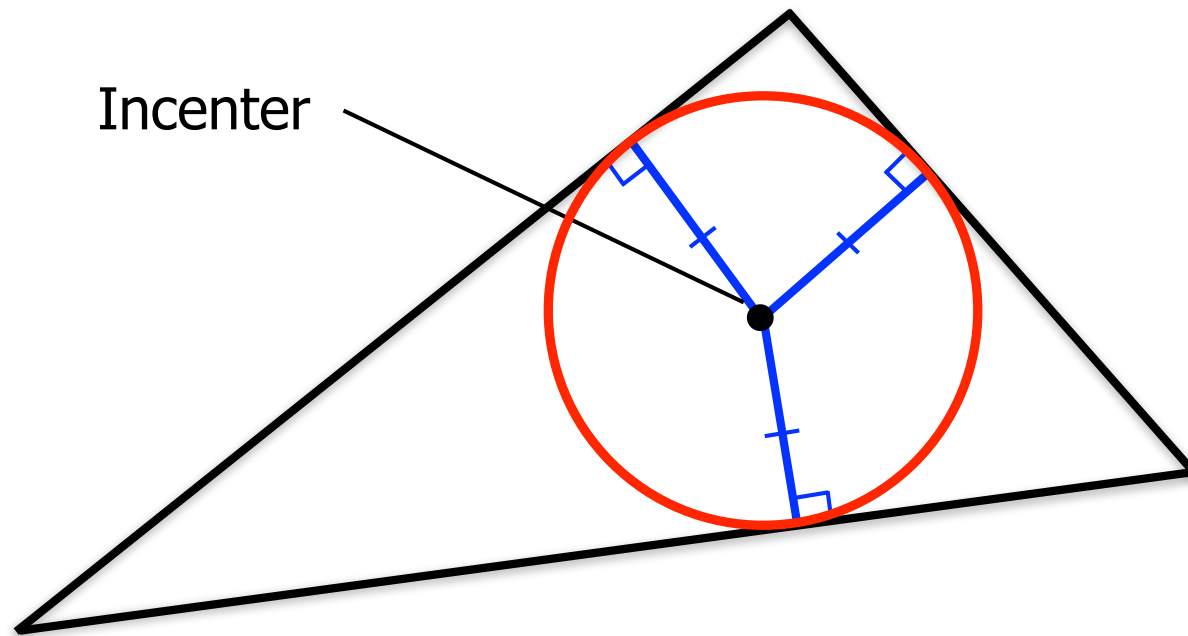
Equidistant from the Sides

# 6.2 Bisectors of Triangles

## Theorem

### Incenter Theorem

The incenter of a triangle is equidistant from the sides of the triangle.



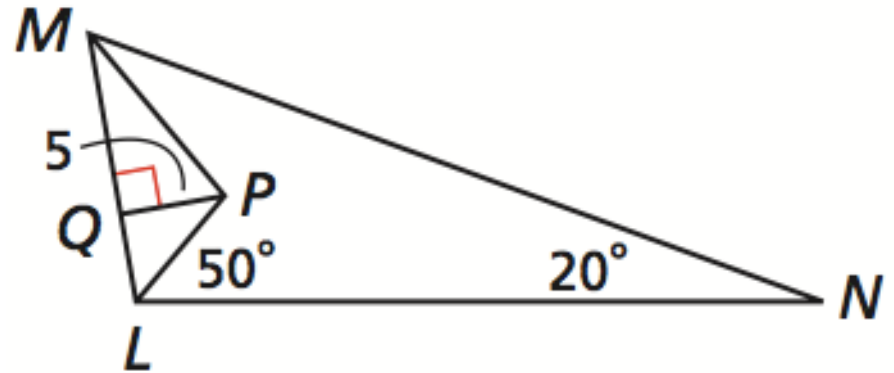
Equidistant from the Sides



# 6.2 Bisectors of Triangles

## Practice:

MP and LP are angle bisectors of  $\triangle LMN$ .  
Find each measure.



- 1) the distance from  $P$  to  $MN$
- 2)  $m\angle PMN$