Name _____

Date _____

EXPLORATIONS

Activity 6

Circumcenter and Incenter

Construct the geometric object by following the instructions below, and then answer the questions about the object.

1. Create a triangle and label it $\triangle ABC$.
2. Construct the perpendicular bisectors of each side of the triangle.
   a. From the Construct Toolbar, select **Perpendicular Bisector**.
   b. Move pointer to side AB until the message ***Perpendicular bisector of this side of the triangle*** appears. Click once.
   c. Move pointer to side BC until the message ***Perpendicular bisector of this side of the triangle*** appears. Click once.
   d. Move pointer to side AC until the message ***Perpendicular bisector of this side of the triangle*** appears. Click once.
   e. Find the intersection point of the perpendicular bisectors and label it W. (This is the *circumcenter* of $\triangle ABC$.)
3. Measure and label the angles.
4. Create an acute triangle.
   a. From the Pointer Toolbar, select **Pointer**.
   b. Move the pointer to vertex A, click, and drag until $\angle A$ is acute.
   c. Move the pointer to vertex B, click, and drag until $\angle B$ is also acute. Do the same for $\angle C$.
5. Where is point W located?

   _____

6. Alter the triangle, keeping it acute.
7. What can you conclude about the location of the circumcenter of an acute triangle?

   _____

8. Create an obtuse triangle.

a. From the Pointer Toolbar, select **Pointer**.

b. Move the pointer to vertex A, click, and drag until $\angle A$ is obtuse.

9. Where is point W located?

_____

10. Alter the triangle, keeping it obtuse.

11. What can you conclude about the location of the circumcenter of an obtuse triangle?

_____

12. Create a right triangle.

a. From the Pointer Toolbar, select **Pointer**.

b. Move the pointer to vertex A, click, and drag until $\angle A$ is a right angle.

13. Where is point W located?

_____

14. Alter the triangle, keeping it right.

15. What can you conclude about the location of the circumcenter of a right triangle?

_____

16. Clear the screen.

17. Create a triangle and label it $\triangle ABC$.

18. Construct the angle bisector of each angle in the triangle.

19. Find the intersection point and label it W. (This is the *incenter* of $\triangle ABC$.)

20. Measure and label the angles.

21. Create an acute triangle.

22. Where is point W located?

_____

23. Alter the triangle, keeping it acute.

24. What can you conclude about the location of the incenter of an acute triangle?

_____

25. Create an obtuse triangle.

26. Where is point W located?

_____

27. Alter the triangle, keeping it obtuse.

28. What can you conclude about the location of the incenter of an obtuse triangle?

_____

29. Create a right triangle.

30. Where is point *W* located?

_____

31. Alter the triangle, keeping it right.

32. What can you conclude about the location of the circumcenter of a right triangle?

_____