EXPLORATIONS

Activity 7

Centroid and Orthocenter

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

1. Create a triangle and label it △*ABC*.

2. Construct the medians.

   a. From the Construct Toolbar, select **Midpoint**.

   b. Move the pointer to side *AB* until the message ***Midpoint of this side of the triangle*** appears. Click once. Type *M*.

   c. Move the pointer to side *BC* until the message ***Midpoint of this side of the triangle*** appears. Click once. Type *N*.

   d. Move the pointer to side *AC* until the message ***Midpoint of this side of the triangle*** appears. Click once. Type *P*.

   e. Create segments $\overline{AN}$, $\overline{BP}$, and $\overline{CM}$.

   f. Find the intersection point and label it *W*. (This is the *centroid* of △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 ∠*A* is acute.

   c. Move the pointer to vertex *B*, click, and drag until ∠*B* also acute. Do the same for ∠*C*.

5. Where is point *W* located?

   _____

6. Alter the triangle, keeping it acute.

7. What can you conclude about the location of the centroid 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 ∠*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 centroid 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 ∠*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 centroid of a right triangle?

   _____

16. Clear the screen.

17. Create a triangle and label it △*ABC*.

18. Construct the altitudes.

   a.   From the Construct Toolbar, select **Perpendicular Line**.

   b.   Move pointer to vertex *A* until the message ***By this point*** appears. Click once.

   c.   Move pointer to side *BC* until the message ***Perpendicular to this side of the triangle*** appears. Click once.

   d.   Construct the altitudes from *B* and *C*.

   e.   Find the intersection point and label it *W*. (This is the *orthocenter* of △*ABC*.)

19. Measure and label the angles.

20. Create an acute triangle.

21. Where is point *W* located?

   _____

22. Alter the triangle, keeping it acute.

23. What can you conclude about the orthocenter of an acute triangle?

   _____

24. Create an obtuse triangle.

25. Where is point *W* located?

_____

26. Alter the triangle, keeping it obtuse.

27. What can you conclude about the location of the orthocenter of an obtuse triangle?

_____

28. Create a right triangle.

29. Where is point *W* located?

_____

30. Alter the triangle, keeping it right.

31. What can you conclude about the orthocenter of a right triangle?

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