Name _____

Date _____

EXPLORATIONS

Activity 12

Transformation

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

1. At the left side of your screen, create a polygon with no symmetry.
   a. From the Lines Toolbar, select **Polygon**.
   b. Click once where you want the first vertex of the polygon.
   c. Continue to click to form different vertices.
   d. Click on the first vertex to end.
2. Create a line to the right of the polygon.
3. Reflect the polygon across the line.
   a. From the Transform Toolbar, select **Reflection**.
   b. Move your pencil toward the polygon until the message ***Reflect this polygon*** appears. Click once.
   c. Move your pencil to the line until the message ***With respect to this line*** appears. Click once.
   d. The reflected image appears.
4. Create a line parallel to the original line to the right of the new image.
5. Reflect the second polygon across your new line.
6. When you reflect an image over two parallel lines, what type of transformation has occurred?

   _____

7. Measure the distance between the two parallel lines.
   a. From the Measure Toolbar, select **Distance and Length**.
   b. Move the pencil toward a point on the first line until the message ***Distance from this point*** appears. Click once.
   c. Move the pencil toward the second line until the message ***To that line*** appears. Click once.

d. Label this **Distance between two parallel lines**.

8. Measure the distance between a vertex of the original polygon (pre-image) and its corresponding vertex in the final polygon (image).

a. From the Measure Toolbar, select **Distance and Length**.

b. Move the pencil toward one vertex of the original polygon until the message ***Distance from this point*** appears. Click once.

c. Move the pencil toward its corresponding vertex in the third polygon until the message ***To that point*** appears. Click once.

d. Label this distance **a =**.

9. Measure the distance from one other vertex to its corresponding vertex in the third polygon. Label this distance **b =**.

10. Record each of the distances below.

Distance between parallel lines = _____ a = _____ b =_____

11. Using the pointer, drag the original line to a new location.

12. Record each of the distances below:

Distance between parallel lines = _____ a = _____ b =_____

13. How do the three distances compare?

_____

14. What can you conclude about the distance between the two parallel lines compared to the distance between the pre-image and image?

_____

15. Clear the screen.

16. Create two intersecting lines on the screen.

17. Create the point of intersection of the two lines and label the point *A*.

18. Create and label additional points on the lines as shown in Figure 11.1.

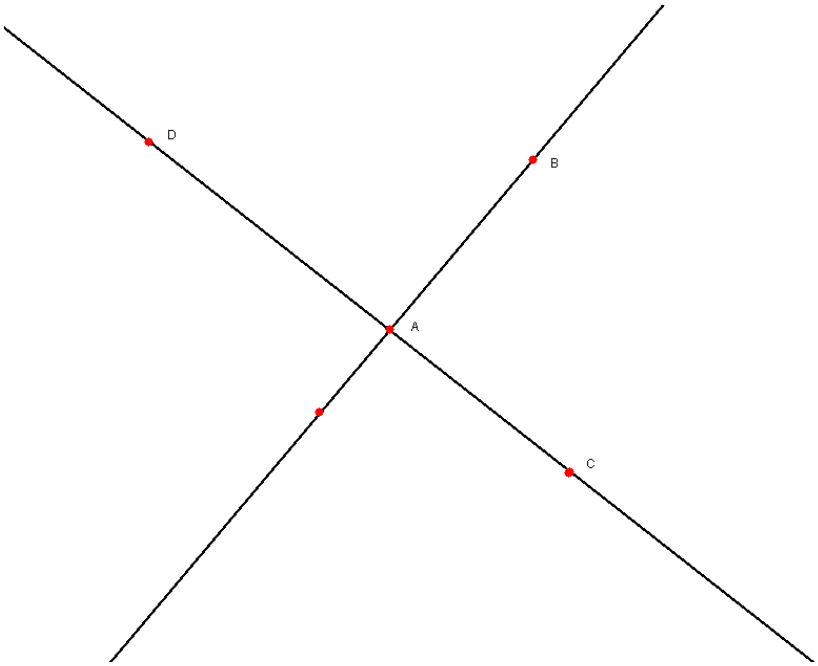

Figure 11.1

19. Construct a polygon with no symmetry in the interior of $\angle DAB$.

20. Reflect the polygon over line $\overline{AB}$.

21. Reflect the new polygon over line $\overline{AC}$.

22. When you reflect an image over two intersecting lines, what type of transformation has actually occurred?

_____

23. Measure and label angle $\angle BAC$.

24. Drag one of the lines so that this angle is an acute angle.

25. Measure the angle between the corresponding parts of the original polygon (pre-image) and your third polygon (image).

a. From the Measure Toolbar, select **Angle**.

b. Click on one vertex in the original polygon.

c. Click on point A.

d. Click on the corresponding vertex in the third image.

26. Label this **pre-image to image =.**

27. Record the following measurements.

$\angle BAC$ = _____ pre-image to image = _____

28. Using the pointer, drag line $\overline{AC}$ to create a different acute angle between the intersecting lines.

27. Record the following measurements:

$\angle BAC$ = _____ pre-image to image = _____

28. What can you conclude about the relationship between the two angles?

_____

_____

_____

31. Drag line $\overline{AC}$ so that the angle between the intersecting lines becomes obtuse.

32. Does your conclusion in **#30** hold true? Why or why not?

_____

_____

_____