

Name _____

Date _____

EXPLORATIONS

Activity 9

Properties of Parallelograms

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

1. Create a parallelogram.
 - a. Construct segment \overline{AB} .
 - b. Construct a line above \overline{AB} parallel to it.
 - c. Label a point at the left end of the new line D .
 - d. Construct segment \overline{AD} .
 - e. Construct a line parallel to \overline{AD} through point B .
 - f. Find the intersection point and label it C .
 - g. From the Draw Toolbar, select **Hide/Show**.
 - h. Move to line \overline{BC} until the message *This line* appears. Click once. A dotted line appears.
 - i. Move to line \overline{CD} until the message *This line* appears. Click once. A dotted line appears.
 - j. Construct segment \overline{CD} and \overline{BC} .

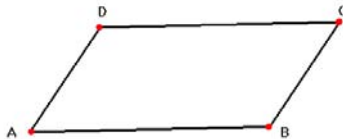


Figure 9.1

2. Find and label the lengths of all the sides.
3. What is the relationship between opposite sides \overline{AD} and \overline{BC} ?

4. What is the relationship between opposite sides \overline{AB} and \overline{CD} ?
- _____
5. Alter parallelogram $\square ABCD$.
- a. From the Points Toolbar, select **Pointer**.
- b. Move to point A until the message **This point** appears. Click once and drag.
6. Is the relationship between the opposites sides the same?
- _____
7. Alter the parallelogram several times by using the pointer to see if the results change. If they do, under what conditions?
- _____
8. What can you conclude about the opposite sides of a parallelogram?
- _____
9. Find and label the measure of each angle.
10. What is the relationship between the opposite angles $\angle A$ and $\angle C$?
- _____
11. What is the relationship between the opposite angles $\angle B$ and $\angle D$?
- _____
12. Alter parallelogram $\square ABCD$.
13. Is the relationship between the opposite angles the same?
- _____
14. Alter the parallelogram several times by using the pointer to see if the results change. If they do, under what conditions?
- _____
15. What can you conclude about the opposite angles of a parallelogram?
- _____
16. What is the relationship between the consecutive angles $\angle A$ and $\angle B$?
- _____
17. What is the relationship between the consecutive angles $\angle B$ and $\angle C$?
- _____
18. Alter parallelogram $\square ABCD$.
19. Is the relationship between the consecutive angles the same?
- _____

20. Alter the parallelogram several times by using the pointer to see if the results change. If they do, under what conditions?

21. What can you conclude about the consecutive angles of a parallelogram?

22. Clear the measurements.

23. Construct segments \overline{AC} and \overline{BD} , which represent the diagonals.

24. Find the intersection point and label it M .

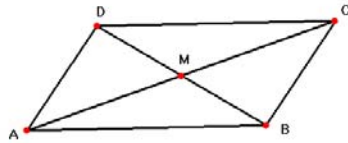


Figure 9.2

25. Find and label the lengths of segments \overline{AM} , \overline{BM} , \overline{CM} , and \overline{DM} .

26. What is the relationship between the diagonals of parallelogram $\square ABCD$?

27. Alter parallelogram $\square ABCD$.

28. Is the relationship between the diagonals the same?

29. Alter the parallelogram several times by using the pointer to see if the results change. If they do, under what conditions?

30. What can you conclude about the diagonals of a parallelogram?
