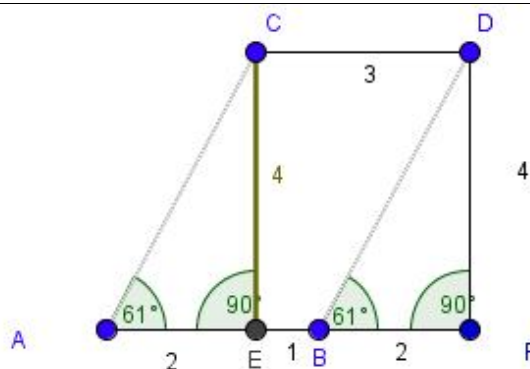# Student Activity Theorem 18

Use in connection with interactive file "Theorem 18" on the Student's CD.

To establish a formula for the area of a parallelogram.

1. What is the area of the rectangle EFDC?

   _____

   _____

2. What are the differences in the rectangle EFDC and the parallelogram ABDC?

   _____

   _____

3. What are the similarities between the triangle AEC and the triangle BFD and how does the area of these triangles compare?

   _____

   _____

   _____

   _____

4. If you take triangle AEC away from the parallelogram ABDC and add the triangle BFD to it, what shape do you get and what is its area? What does that inform you about the relationship between the area of the parallelogram ABDC and the area of the rectangle EFDC?

   _____

   _____

   _____

5. Making sure that the line segment CE in the interactive file stays the same as it was originally, move the point A so that it overlaps with point E. What do you now notice about the shape of the parallelogram in comparison with the rectangle EFDC?

   _____

   _____

6. What is meant by the perpendicular height of a parallelogram and what line segment is the perpendicular height of the parallelogram ABDC?

    _____

    _____

7. Does the line segment that represents the perpendicular height always have to be at right angles to the base?

    _____

    Do you conclude that "The area of a parallelogram is the base times height."? Explain.

    _____

    _____

8. Move the base slider and / or the points and check if you still agree with the statement, "The area of any parallelogram is the base times height."

    _____

    _____

Challenges

9. Find the area of a parallelogram with base equal to 6 cm and height equal to 8 cm? Show calculations.

    _____

    _____

10. If a parallelogram has area equal to 96 cm^2 and its height is 12 cm, what is its base? Show calculations.

    _____

    _____

11.

An equilateral triangle can be divided into equal-sized triangles using lines parallel to the opposite sides. The lines connect two midpoints. How many parallelograms can you find in the figure?
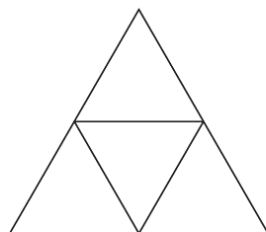
Suppose the area of the large triangle is 16 square units. What is the area of each of the parallelograms?

©http://teacherweb.puyallup.k12.wa.us/wildwood/sanderson/documents/covering_and_surrounding_homework_problems_-_investigation_4.pdf. See this link for other examples of applications of the area of a parallelogram.