Area Formulas

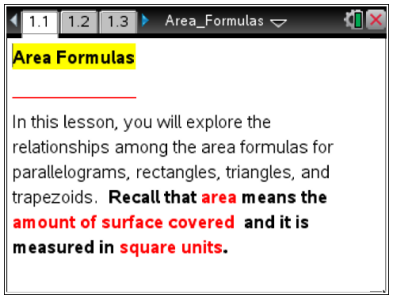
Student Activity

Name _____

Class _____

Open the TI-Nspire document *Area_Formulas.tns.*

How is the area of a parallelogram related to the area of a rectangle? How are triangles and trapezoids related to parallelograms? This lesson lets you explore the relationships among their area formulas.



Move to page 1.2.

1. Use the "up" arrow to show the dimension labels of the rectangle.
   a. What are the labels for the dimensions of the given rectangle?

   b. What is the formula for the area of the rectangle in terms of base and height?

2. Drag the top left or bottom right vertex to change the dimensions of the rectangle. If you change the dimensions of the rectangle, would this change the formula for the area of the rectangle?

Tech Tip: To change the dimensions of the rectangle, select a vertex of the figure and drag it. Note that the point at a vertex of the rectangle will not be visible until you begin dragging it. Dragging the point at the top left corner of the figure will change the height. Dragging the point at the bottom right corner will change the base.

Move to page 1.3. After reading the instructions, move to page 1.4.

3. a. How do the base and height of the parallelogram compare to the base and height of the rectangle at the top of the screen?

   b. Move point *H* or point *B*. Describe the changes that occur in the rectangle and the changes in the parallelogram.

4. Drag point *P* to the right as far as you can.
   a. Explain why the new figure on the bottom of the screen is a rectangle.

   b. What does this tell you about the area of the original parallelogram?

   c. Why do the parallelogram and the rectangle have the same area?

   d. What could be a formula for the area of the parallelogram?

Move to page 2.1. After reading the instructions, move to page 2.2.

5. a. How do the base and height of the triangle compare to the base and height of the parallelogram at the top of the screen?

   b. Move point *H* or point *B* on the parallelogram. Describe the changes that occur in the parallelogram and the changes in the triangle.

6. Rotate point *Q* until it is as far right as possible.
   a. What type of figure is formed?

   b. How does the area of the original shaded triangle compare to the area of the parallelogram?

7. If the area of a parallelogram is base times height, then what could be a formula for the area of the triangle?

Move to page 3.1. After reading the instructions, move to page 3.2.

8. Rotate point *R* until it is as far right as possible.
   a. What type of figure is formed?

   b. How is the base of the parallelogram related to the trapezoid?

   c. Write an expression to represent the area of the parallelogram—either the parallelogram on the top of the screen or the newly formed parallelogram at the bottom of the screen.

9. How does the area of the original shaded trapezoid compare to the area of the parallelogram?

10. If the area of a parallelogram is base times height, then what could be a formula for the area of the trapezoid?

11. For each problem below:
    - Draw the figure.
    - Write a formula that could be used to find the area of each figure.
    - Use your formula to find the area of each figure.

    a. A parallelogram with base of 7.5 units and height of 8 units

    b. A triangle with base of 13 units and height of 4 units

    c. A trapezoid with height of 5 units, and bases of 12 units and 6 units