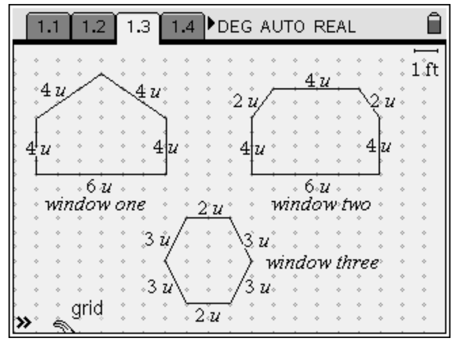
Application of Area Formulas

TIMATH.COM: GEOMETRY



Math Objectives

- Students will be able to recognize how to break a polygon into familiar shapes, such as triangles, rectangles, and trapezoids.
- Students will be able to find the areas of triangles, rectangles, trapezoids, and parallelograms using area formulas.
- Students will see an example of how these shapes can be used to solve an application problem.

Vocabulary

- rectangle
- triangle
- trapezoid
- parallelogram
- polygon
- base
- height
- area

About the Lesson

- This lesson is a follow-up lesson to the activity *Area Formulas*.
- This lesson involves students breaking polygons up into familiar shapes, such as triangles, rectangles, and trapezoids, in order to find the areas of the polygons.

Related Lessons

- Prior to this lesson: Area Formulas
- After this lesson: Sum of Exterior Angles of Polygons

TI-Nspire™ Technology Skills:

- Download TI-Nspire document
- Open a document
- Move between pages
- Create a segment
- Create a perpendicular line
- Find the length of a segment
- Create a polygon
- Find the area of a polygon

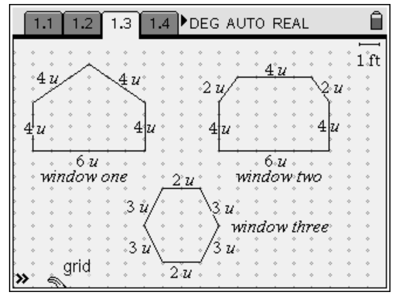
Tech Tips:

- *Make sure the **font size** on your TI-Nspire handhelds is set to Medium.*

Lesson Materials:

Student Activity
Application_of_Area_Formulas_Student.PDF
Application_of_Area_Formulas_Student.DOC

TI-Nspire document
Application_of_Area_Formulas.tns



Discussion Points and Possible Answers:

TI-Nspire Problem/Pages 1.3, 1.20, and 1.23

Tech Tip: *Press* esc *to hide the entry line if students accidentally click the chevron.*

1. Now that you have used the segment tool to divide each window, how many triangles are there? Rectangles? Trapezoids?	**Triangles: 1** **Rectangles: 2** **Trapezoids: 3**
2. What formula would you use to find the area of a triangle?	$A = \frac{1}{2} \cdot b \cdot h$ ***Teacher Tip:*** *The variables b and h represent base and height. A discussion of these variables representing base and height might be useful. Also, a discussion of the dot symbol representing multiplication may be needed.*
3. What formula would you use to find the area of a rectangle?	$A = b \cdot h$
4. What formula would you use to find the area of a trapezoid?	$A = \frac{1}{2}(b_1 + b_2)h$
5. Find the area of window 1 by finding the areas of the triangle and rectangle and then adding them together. Show your work below.	**Triangle:** $A = \frac{1}{2} \cdot b \cdot h$ $A = \frac{1}{2} \cdot 6 \cdot 3$ $A = 9\ \text{ft}^2$ **Rectangle:** $A = b \cdot h$ $A = 6 \cdot 4$ $A = 24\ \text{ft}^2$ **Total Area:** $9\ \text{ft}^2 + 24\ \text{ft}^2 = 33\ \text{ft}^2$ ***Teacher Tip:*** *Any lengths or areas that appear with decimal places should be changed to zero decimal places using the* ***Attributes*** *tool (****MENU > Actions > Attributes****).*

6. Find the area of window 2 by finding the areas of the trapezoid and rectangle and then adding them together. Show your work below.	**Trapezoid:** $A = \frac{1}{2}(b_1 + b_2)h$; $A = \frac{1}{2}(4 + 6) \cdot 2$; $A = 10 \text{ ft}^2$ **Rectangle:** $A = b \cdot h$; $A = 6 \cdot 4$; $A = 24 \text{ ft}^2$ **Total Area:** $10 \text{ ft}^2 + 24 \text{ ft}^2 = 34 \text{ ft}^2$
7. Find the area of window 3 by finding the areas of both trapezoids and then adding them together. Show your work below.	**Top Trapezoid:** $A = \frac{1}{2}(b_1 + b_2)h$; $A = \frac{1}{2}(2 + 4) \cdot 3$; $A = 9 \text{ ft}^2$ **Bottom Trapezoid:** $A = \frac{1}{2}(b_1 + b_2)h$; $A = \frac{1}{2}(2 + 4) \cdot 3$; $A = 9 \text{ ft}^2$ **Total Area:** $9 \text{ ft}^2 + 9 \text{ ft}^2 = 18 \text{ ft}^2$
8. Use the **Area** tool (**MENU > Measurement > Area**) to find the area of each of the three polygons you just created. How did these areas compare to your results from Questions 5, 6, and 7?	**Answers may vary and are dependent on student responses to Questions 5, 6, and 7.** ***Teacher Tip:*** *Any lengths or areas that appear with decimal places should be changed to zero decimal places using the* ***Attributes*** *tool.*
9. Find the area of the parallelogram on page 1.23. Show your work below.	$A = b \cdot h$; $A = 7 \cdot 5$; $A = 35 \text{ ft}^2$
10. How many parallelogram pieces of glass must you order to make the three windows? Explain.	**Three pieces will need to be ordered, since the total area of all windows is 85 square feet and the area of the parallelogram piece is 35 square feet.**

Wrap Up:

Upon completion of the discussion, the teacher should ensure that students are able to:

- Understand how to find the areas of triangles, rectangles, trapezoids, and parallelograms using the area formulas.
- Understand how triangles, rectangles, trapezoids, and parallelograms can be used to solve real-world problems.