



Learning Project 8 Geometry – Area, Perimeter, & Volume

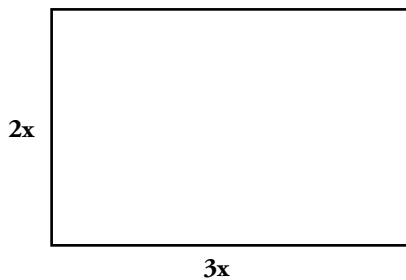
Inquiry Activity Geometry 8–2: Area of Rectangles

(Note: *Italicized portions should be directed to students.*)

1. Identifying the Problem (Item #11, PA) Calculator allowed.

Read the question carefully, as you would if taking the actual test.

11. The dimensions of the rectangle shown below are $2x$ by $3x$.



Calculator
Allowed



How many square units are in this area?

- 1) 12
- 2) $5x$
- 3) $10x$
- 4) $5x^2$
- 5) $6x^2$

Here are some problem clarification questions you may want to consider when reading test questions.

What words and/or symbols might be important to understand to answer this problem and what are they telling you?

It is possible that learners would pick dimensions, rectangle, square units, area among others.

What words and/or symbols are unfamiliar and what do you think they mean?

Cannot know what words the learner will choose.

2. Becoming Familiar with the Problem

Ask yourself questions like these about the problem, taking note of the ones that were especially helpful so that you can remember to use them when you take the test.

Reread the question.

In your own words, what are you being asked to find?

3. Planning, Assigning and Performing Tasks

Try to answer the test question any way you can, even if you have to guess, but try to be aware of the reasoning and operations that you are using. The following can be helpful.

Make a sketch that will help you to determine what is to be found in this item.

Try using the formulas page.

Estimate an answer.

Eliminate some of the answer choices and explain why you eliminated them.

Choose an answer and be ready to explain how you found your answer.

4. Sharing with Others

Telling other people what you know helps you to understand the material better. So take this opportunity not only to share your knowledge, but also to learn it more completely.

Small Groups: Compare your answer to others in the group and explain how you found it. Compare sketches that were used to help find an answer, and determine which sketch helps the best. If you have trouble agreeing on one answer, be ready to explain the reasons behind your disagreement.

There are many possibilities for disagreement. Some may want to add rather than multiply the sides. Some may not know what to do with x 's. Everyone in the class can learn from the disagreements, so they should be brought to the whole-class discussion.

Explain any help you got from the formulas page.

Research the meaning of the unfamiliar words from this problem and the math terms square units and area.

Whole class: Report your group's answer (or your disagreement over the answer) to this question, along with a sketch that best helps you come to an answer, an explanation of how the formulas page can help, and the words and/or symbols and their definitions that were discussed in your group.

Take notes on any different ways that others used to find the answer.

4. Reflecting, Extending and Evaluating

This Inquiry Activity continues to explore ways to avoid errors caused by confusion between area and perimeter that are common on tests. The formula for area should be discussed, together with how to express x in terms of a square unit. We continue to explicitly examine the difference between perimeter and area in their physical attributes, the type of units used by each and the applications of each. Display three measuring units during this discussion: a piece of string that is 1 foot long, a 1 square foot piece of newsprint (a small piece that is 1 sq inch would also be helpful), and a cubic inch. (Any size cube will do if you cannot find a cubic inch)

Reflect: *Think about what you learned.* (group activity or instructor led)

Here are some questions to start you thinking about the experience you just had. Thinking about what you have learned and experienced is part of the learning process. When the focus is only on the answer, you don't get much time to think about what was learned.

Use a piece of grid paper and draw a rectangle that looks like the one in the problem. How do you show the x ?

I prefer using the centimeter square grid paper. Common quarter-inch grids are too small to be effective in this activity. The x would just be attached to the number for each dimension as it appears in the problem.

Now count the number of squares in the rectangle. What will you do with the x when expressing the area of this rectangle? Research in the texts (or the work you did in previous Learning Projects) how x gets represented in the answer.

Find the formula for the area of a rectangle on the formulas page. Would you get the same answer using the formula as you did when you counted squares?



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Let us say that $x=3$. Draw a rectangle that represents the dimensions of this rectangle. Now count the number of squares. What has happened to the x in the answer?

Find the formula for the area of a rectangle on the formulas page. Would you get the same answer using the formula as you did when you counted squares?

Extending: Extend what you learned to new situations.

These questions use the information from the last Inquiry Activity to compare that information to the new material discussed here. Although you could extend the activity by using yardsticks to measure the room exactly, you will challenge the students more (and have more fun!) by asking them to estimate the lengths. They will likely pace off the length and width (You can compare one person's pace-length to another's), and use a person standing against the wall to estimate the height. In this way, yards and feet will be intermixed and need to be made uniform. Since there are no items on this practice test that involve volume, this activity should be extended to include the volume of a rectangular solid such as the room.

In extending, you are being asked to transfer the information presented in the Practice Test question to other information or situations you already know and maybe making new connections to other information.

When you find the area of a figure, you are finding how much surface is inside. Your answer tells how many square units are there. Discuss situations in your lives that would require you to find area

Estimate the measurements of the room that you are in.

What is its approximate length, width, and height?

What is the approximate area of the floor?

What is the approximate area of the largest wall?

What is the approximate area of the ceiling?

What is the approximate volume of the room?

A good estimation process. You might want to make connections to the estimation process often used in step 3 of the math template.

How is the formula for volume a natural progression from the formula for area?

Multiplying two dimensions for area and multiplying 3 dimensions for volume.

Evaluating: Assess what you learned and how you learned it.

In this last step, you get a chance to review the content of what you learned and the methods used to learn. There are no right or wrong answers to these questions; it is your chance to look more closely at your learning style and the opportunity to state how you benefited or didn't benefit from the content and/or the methods to help you pass the GED test.

What progress did you make in achieving your personal math goals by participating in this activity?

Of all the things that you learned in this activity, what do you consider to be the most important for you to remember while taking the test?

Evaluate the formulas page as a test-taking tool.

Which things do you think will be the most important to you in your life?

Ask for practice exercises, if you think you need them.