

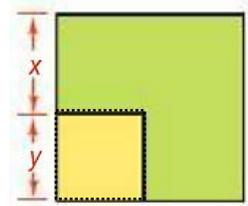
UNIT 4 PERFORMANCE TASK

The problems below will challenge you to pull together many concepts and skills of algebra that you have learned. First answer **Problem #1** and then choose **one additional** problem to complete on a separate sheet of paper. Be sure to answer and label all parts of the question. **Show all your work (diagrams, tables or computations)**. If you do the work in your head, explain in writing how you did the work. You **may** answer three for extra credit.

BIG IDEA Variable How do variables help you solve real-world problems?

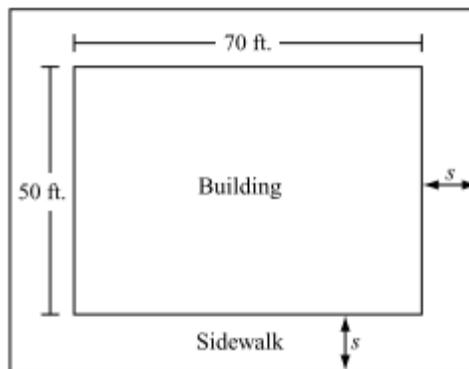
1. Suppose you cut a small square from a square sheet of cardboard.

- a. Write an expression, in terms of x and y , of the area of the square sheet of cardboard.
- b. Write an expression, in terms of y , of the area of the small square cut from the cardboard.
- c. Write an expression, in terms of x and y , that represents the area of the remaining part. Write your answer in *expanded* form.
- d. Write two expressions for the length and width of a rectangle whose area is equal to the area of the remaining part.



BIG IDEA Modeling How can you model real-world situations using a system of equations?

2. A building that has a rectangular base is surrounded by a sidewalk. The width of the sidewalk, s , is the same on all four sides of the building. Some of the dimensions of the building and sidewalk are shown in the diagram below.



- a. Write an expression, in terms of s , to represent the length of the base of the building and sidewalk.
- b. Write an expression, in terms of s , to represent the width of the base of the building and sidewalk.
- c. Write an expression, in terms of s , to represent the total area of the base of the building and sidewalk. Write your answer in *expanded* form.
- d. A construction company is hired to repave the sidewalk around the building. What is the area, in terms of s , of sidewalk they need to repair? Write your answer in *expanded* form.

BIG IDEA Modeling How can you model real-world situations using a system of equations?

3. Kyle is using a crate in the shape of a right rectangular prism for an egg drop project in Physics. The height of a crate is x centimeters, the width is 4 centimeters less than the height, and the length is 9 centimeters more than the height.
- a. Write an expression, in terms of x , for the width of the crate.
 - b. Write an expression, in terms of x , for the length of the crate.
 - c. Write an expression, in terms of x , to represent the volume of the crate. Write your answer in *expanded* form.
 - d. Kyle plans to fill the crate with foam insulation to provide the egg with added protection. Kyle must leave 180 cubic centimeters of space for the egg. Write an expression, in terms of x , to represent the dimensions of the space occupied by foam. Write your answer in *factored* form.