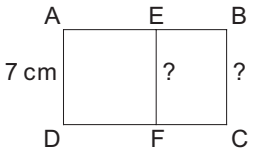
Tiling in a Frame

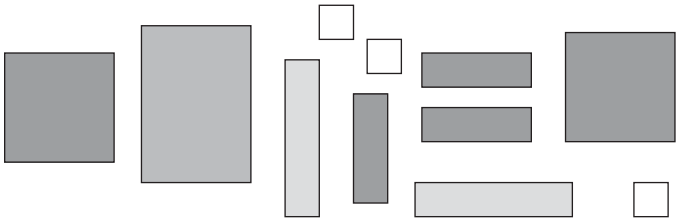
For GSP5 Name:

GET READY

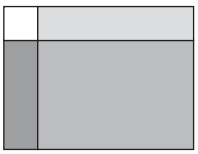
A. In the figure below, *ABCD* is a rectangle. Segment *EF* is perpendicular to segment *DC*. What are the measures of segments *EF* and *BC*? Why?

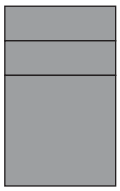


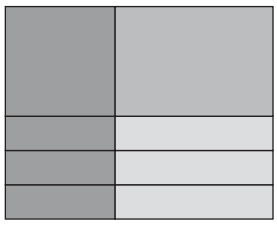
B. Write the following area collection as a sum. Combine like terms.



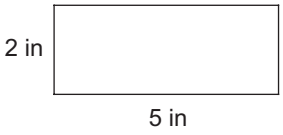
C. Find the perimeter of the following rectangles.

a. 

b. 

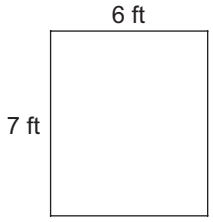
c. 

D. Find the area of the rectangles shown here. Write the area as a product of the dimensions.



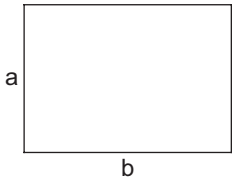
____ ____ = ____

Dimensions Area



____ ____ = ____

Dimensions Area



____ ____ = ____

Dimensions Area

E. Draw a picture of a rectangle representing the product $(3)(4) = 12$.

F. Draw a picture of a rectangle representing the product $(x + 1)(x + 2)$. What do you think this area will be?

Tiling in a Frame

For GSP5 Name:

In this activity you'll explore the areas of rectangles when you know the dimensions, even if the length and width include variables.

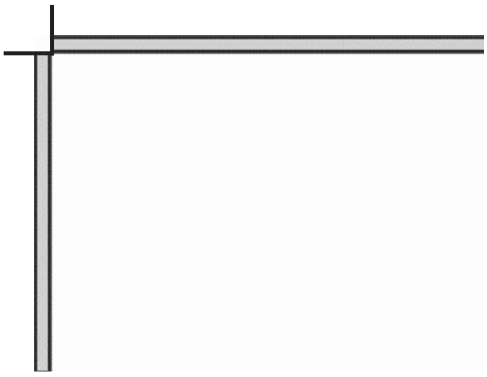
EXPLORE

1. Open **Tiling in a Frame.gsp.** If you don't know the names of the tiles, go to page "Tiles." Otherwise, go to page "Frame."

2. Drag tiles from the stacks to the outside edges of the frame to represent the product $(x + 1)(x + 2)$.

3. Use tiles to build a rectangle inside the frame with dimensions that match those along the outside edges of the frame.

4. Make a sketch of the finished arrangement and write out the multiplication as an area equation.

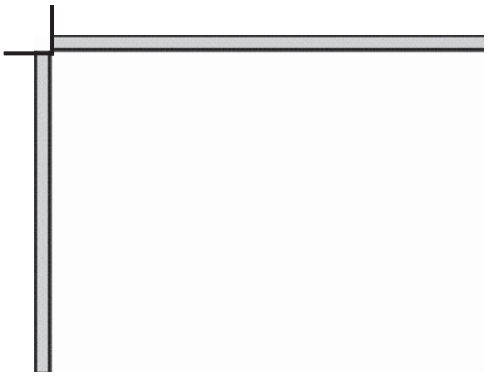


(_____)(_____) = _____

Dimensions Area

5. Press *Reset* to return all tiles to the stacks.

6. Repeat steps 2–5 for the product $(5)(x + 2)$.



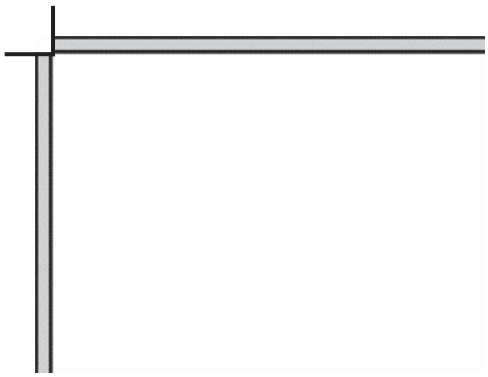
(_____)(_____) = _____

Dimensions Area

7. Multiply $(y + 2)(3x)$. Sketch the finished arrangement.

(_____)(_____) = _____
Dimensions Area

8. Multiply $(2x + 3)(x + 1)$. Sketch the finished arrangement.



(_____)(_____) = _____
Dimensions Area

9. Multiply $(y + 3)(x + y + 1)$. Sketch the finished arrangement.

(_____)(_____) = _____
Dimensions Area

10. Go to page "Regions." Suppose you had to multiply $(2x + 6)(3x + 2)$. How many tiles would you need to build a rectangle for this?

11. Press *Show Regions.* Look at the red points, where the dashed lines begin. How are these red points related to the dimension tiles?

12. Instead of building a rectangle, you'll divide the space into regions, separating like terms. Complete the multiplication table and write the multiplication equation.

	$3x$	2
$2x$		$4x$
6		

(_____)(_____) = _____

Dimensions Area

13. Multiply $(4x + 7)(x + y)$ as you did in step 12.

(_____)(_____) = _____

Dimensions Area

14. Multiply $(y + 3)(x + y + 1)$ using a multiplication table. How can you determine the number of columns and rows you need in the table?

EXPLORE MORE

15. Go to page "Explore More." Use the dynamic tile tools in the Custom Tools menu to construct an arrangement. Choose a tool and click an existing point in the sketch. There are three points you can start with, one for each dimension along the frame and one for the inside of the frame. To connect new tiles to existing tiles, move the pointer until a point on the existing tile becomes highlighted and then click.

    Drag the x and y sliders to see how the arrangement adjusts to their new values. If you've constructed your arrangement correctly, it will hold together when you drag the sliders.