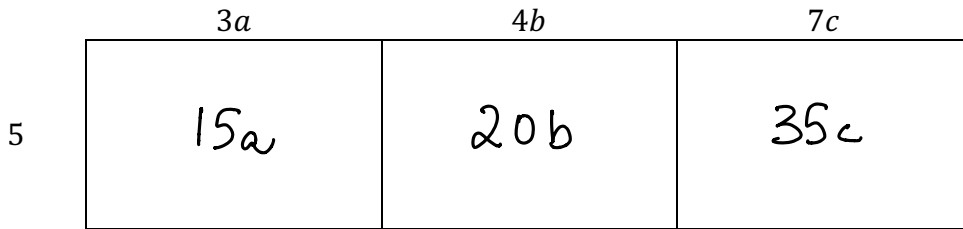


**LEARNING OBJECTIVE:** We will use an area model to find the area of rectangles and solve mathematical problems. (G7M6L21)

**ACTIVATING PRIOR KNOWLEDGE**

We know how to use an area model to multiply

Area Model = Array Model



$15a + 20b + 35c$

Multiply using an area model:

$34 \times 52 = (30+4)(50+2)$

	$50$	$2$
$30$	$1500$	$60$
$4$	$200$	$8$

$(30 \cdot 50) + (30 \cdot 2) + (4 \cdot 50) + (4 \cdot 2)$   
 $30(50+2) + 4(50+2)$   
 $= 1768$

$$\begin{array}{r} 52 \\ \times 34 \\ \hline \end{array}$$

**CONCEPT DEVELOPMENT**

We can use area models to help us understand real world area problems.

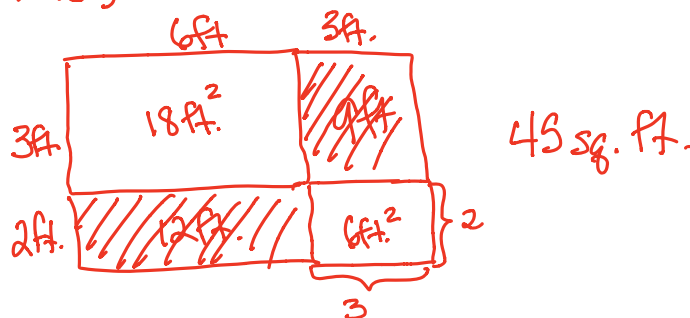
Example: A small backyard garden is 6ft. in length and 3ft. in width. The plot needs to be expanded 3 feet in length and 2 feet in width. What will the new area of the garden be?

SOLVE WITH MATH:

O.G.:  $6 \times 3 = 18 \text{ sq. ft.}$   
 E.G.:  $(6+3) \times (3+2)$   
 $9 \times 5 = 45 \text{ sq. ft.}$  (EXTENDED)

DRAW A PICTURE!

(AREA MODEL)

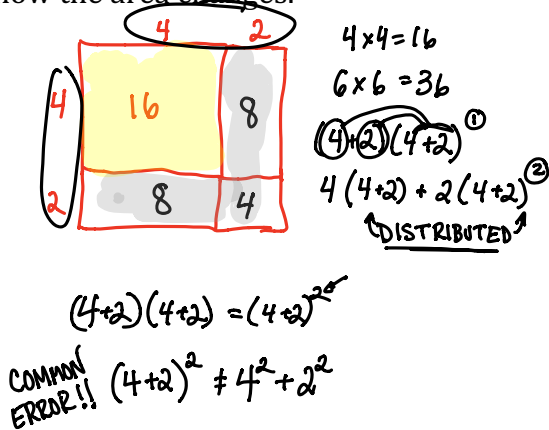


### GUIDED PRACTICE

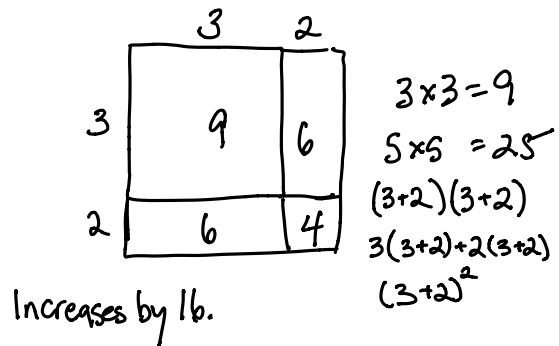
#### Steps for Solving Area Model Problems

1. Read each problem carefully and identify the dimensions and how the dimensions are changing.
2. Draw a picture that represents the problem.
3. Write an expression and simplify in order to find the area you're looking for.

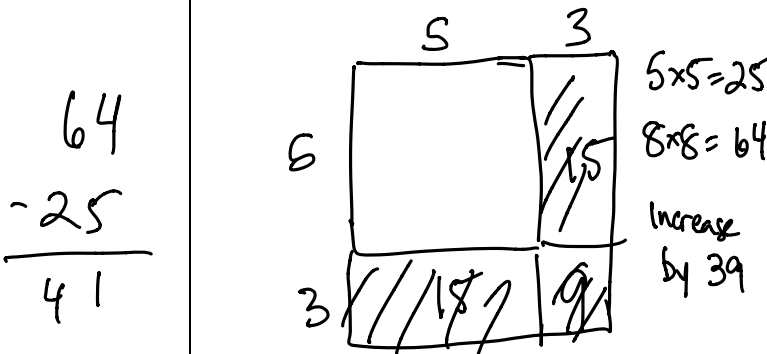
A square that has a side length of 4 units is increased by 2 units on each side. How does the area change? By how many units? Draw a picture to show how the area changes.



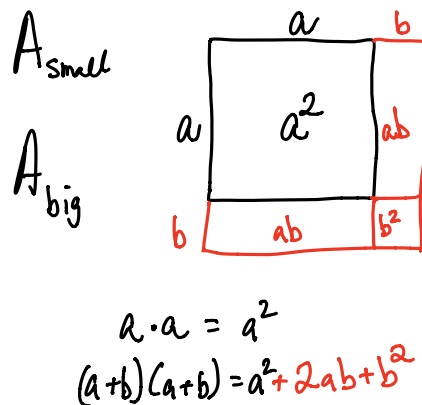
Draw a picture for a square with side length of 3 units that is increasing by 2 units. Show the area calculations and determine how the area changes.



Draw a diagram for a square with a side length of 5 units that is increasing by 3 units. Show the area calculations and determine how the area changes.

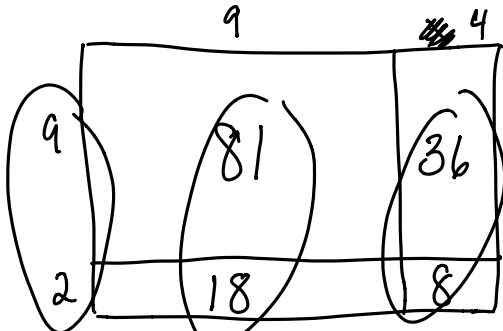


Draw a diagram for a square with a side length of  $a$  units that is increasing by  $b$  units. Show the area calculations and determine how the area changes.



Kamelia draws a square that is 9 units by 9 units. She increases the length by 2 units and the width by  $x$  units. If the area of the large rectangle created is 143 square units, find the value of  $x$ .

$$(9+2)(9+x) = 143$$



$$\begin{array}{r} 11(9+x) = 143 \\ 11 \qquad 11 \end{array}$$

$$9+x = 13$$

$$\boxed{x=4}$$

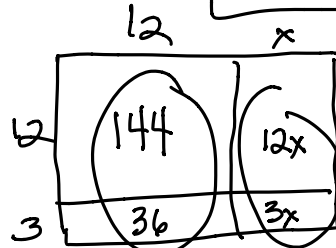
Tyler draws a square that is 12 units by 12 units. She increases the length by  $x$  units and increases the width by 3. The new area of the rectangle is 255 units. What is the new length?

$$(12+x)(12+3) = 255$$

$$\frac{(12+x)(15) = 255}{15 \qquad 15}$$

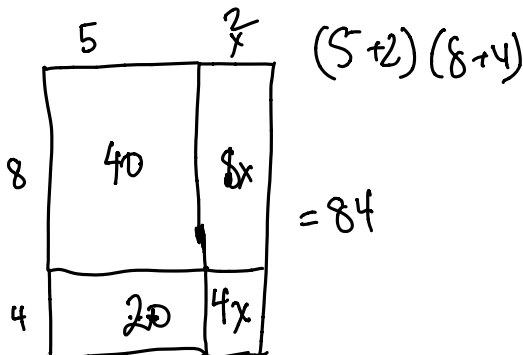
$$12+x = 17$$

$$\boxed{x=5}$$



$$\begin{array}{r} 180 + 15x = 255 \\ -180 \qquad -180 \\ \hline 15x = 75 \qquad x=5 \end{array}$$

Bettina draws a rectangle that is 5 units in length by 8 units in width. She increases the length by  $x$  units and the width by 4 units. The new area is 84 square units. Find the new length.

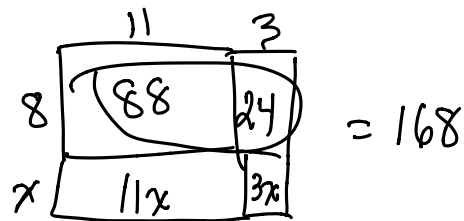


$$\begin{array}{r} 60 + 12x = 84 \\ -60 \qquad -60 \\ \hline 12x = 24 \end{array}$$

$$\frac{12x}{12} = \frac{24}{12}$$

$$\boxed{x=2}$$

Laura draws a rectangle 11 units in length by 8 units in width. If Laura increases the length by 3 and the width by  $x$  units, the new area will be 168 square units.



$$14x + 112 = 168$$

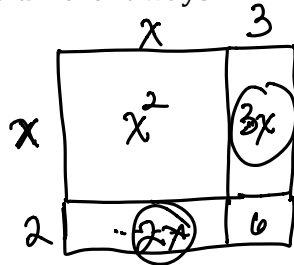
$$\begin{array}{r} -112 \qquad -112 \\ \hline 14x = 56 \end{array}$$

$$\frac{14x}{14} = \frac{56}{14}$$

$$x = 4$$

$$\boxed{x=4}$$

Will draws a square that has unknown side lengths of  $x$  units. He increases the length by 3 units and the width by 2 units. Write an expression for the new area two different ways.



$$\textcircled{1} (x+3)(x+2) \quad x(x+2) + 3(x+2)$$

$$\textcircled{2} x^2 + 5x + 6$$

Louis draws a square that has unknown side lengths of  $x$  units. He increases the length by 2 units and the width by 4 units. Write an expression for the new area two different ways.

$$x^2 + 6x + 8$$

$$(x+2)(x+4)$$

$$x(x+4) + 2(x+4)$$

$$x(x+2) + 4(x+2)$$

### INDEPENDENT PRACTICE

Use an area model to multiply  $31 \times 31$ .

Use an area model to multiply  $42 \times 42$ .

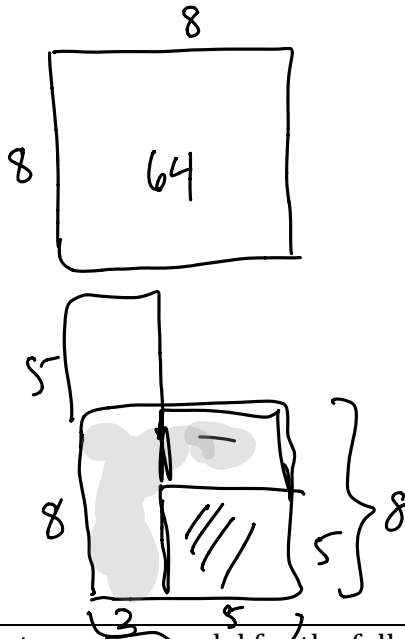
Use area models to show that

$$8^2 - 5^2$$

is equal to  $64 - 25 = 39$

$$(8 + 5)(8 - 5)$$

$$13 \cdot 3 = 39$$



Use area models to show that

$$a^2 - b^2$$

is equal to

$$(a + b)(a - b)$$

Create an area model for the following product and write an equivalent expression to represent the area.

$$(x + 1)(x + 6)$$

Create an area model for the following product and write an equivalent expression to represent the area.

$$(x + 4)(x + 3)$$

Name: \_\_\_\_\_

Math 7.1

Mr. Rogove

Date: \_\_\_\_\_

## **CLOSURE**

No closure.

## **NOTES**

**ALIGNS WITH LESSON 21 FROM MODULE 6 GRADE 7.**