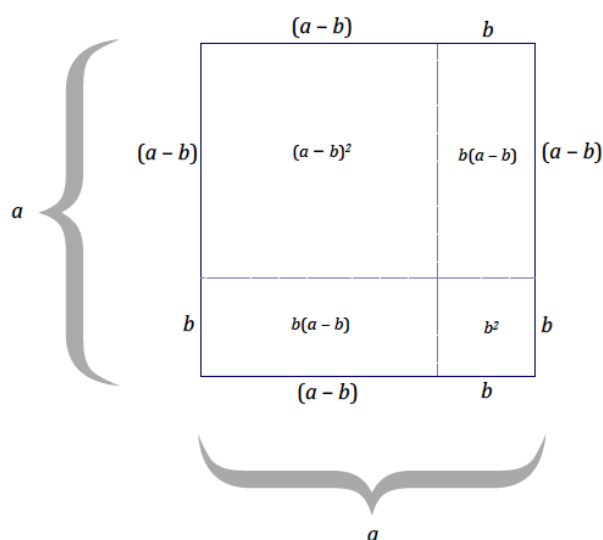


Lesson Summary

- The properties of area are limited to positive numbers for lengths and areas.
- The properties of area do support why the properties of operations are true.

Problem Set

1. A square with a side length of a units is decreased by b units in both length and width.

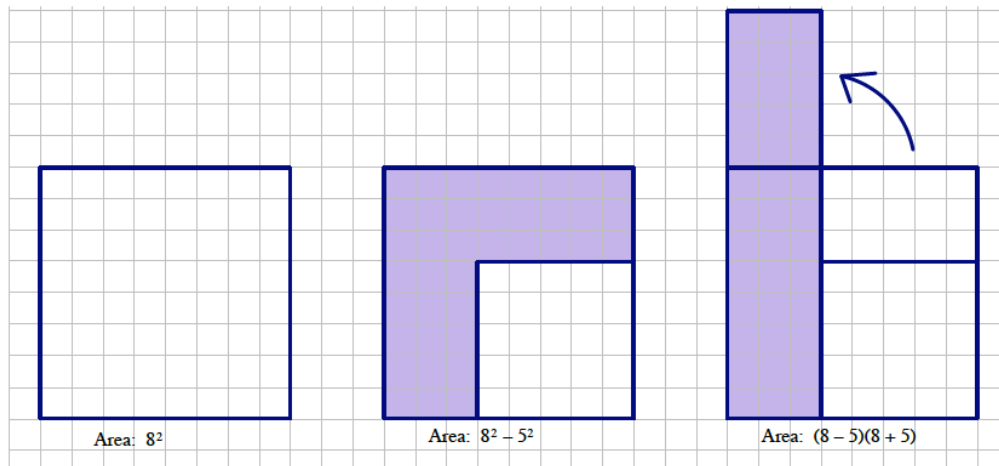


Use the diagram to express $(a - b)^2$ in terms of the other a^2 , ab , and b^2 by filling in the blanks below:

$$\begin{aligned}
 (a - b)^2 &= a^2 - b(a - b) - b(a - b) - b^2 \\
 &= a^2 - \underline{\hspace{1cm}} + \underline{\hspace{1cm}} - \underline{\hspace{1cm}} + \underline{\hspace{1cm}} - b^2 \\
 &= a^2 - 2ab + \underline{\hspace{1cm}} - b^2 \\
 &= \underline{\hspace{2cm}}
 \end{aligned}$$

2. In Example 3, part (c), we generalized that $(a + b)^2 = a^2 + 2ab + b^2$. Use these results to evaluate the following expressions by writing $1,001 = 1,000 + 1$.
- Evaluate 101^2 .
 - Evaluate $1,001^2$.
 - Evaluate 21^2 .
3. Use the results of Problem 1 to evaluate 999^2 by writing $999 = 1,000 - 1$.

4. The figures below show that $8^2 - 5^2$ is equal to $(8 - 5)(8 + 5)$.



- Create a drawing to show that $a^2 - b^2 = (a - b)(a + b)$.
 - Use the result in part (a), $a^2 - b^2 = (a - b)(a + b)$, to explain why:
 - $35^2 - 5^2 = (30)(40)$.
 - $21^2 - 18^2 = (3)(39)$.
 - $104^2 - 63^2 = (41)(167)$.
 - Use the fact that $35^2 = (30)(40) + 5^2 = 1,225$ to create a way to mentally square any two-digit number ending in 5.
5. Create an area model for each product. Use the area model to write an equivalent expression that represents the area.
- $(x + 1)(x + 4) =$
 - $(x + 5)(x + 2) =$
 - Based on the context of the area model, how do the expressions provided in parts (a) and (b) differ from the equivalent expression answers you found for each?
6. Use the distributive property to multiply the following expressions.
- $(2 + 6)(2 + 4)$
 - $(x + 6)(x + 4)$; draw a figure that models this multiplication problem.
 - $(10 + 7)(10 + 7)$
 - $(a + 7)(a + 7)$
 - $(5 - 3)(5 + 3)$
 - $(x - 3)(x + 3)$