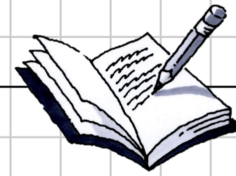
CHAPTER 6: DIVIDING AND BUILDING EXPRESSIONS

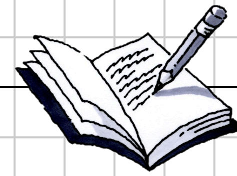
Date:
Lesson:

Learning Log Title:



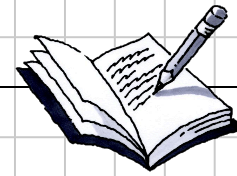
Date:
Lesson:

Learning Log Title:



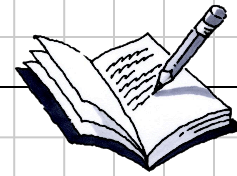
Date:
Lesson:

Learning Log Title:



Date:
Lesson:

Learning Log Title:

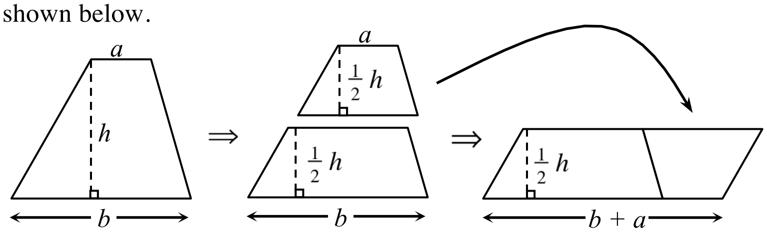


Notes:

MATH NOTES

AREA OF A TRAPEZOID

There are multiple ways to divide a trapezoid and rearrange the pieces into a parallelogram with the same area. For example, the trapezoid can be divided parallel to its two bases to create two smaller trapezoids that are each half of the height of the original trapezoid. Those two pieces can be rearranged into a parallelogram, as shown below.



Therefore, to find the **area of a trapezoid**, find the product of half of the height (h) and the sum of the two bases (a and b).

$$A = \frac{1}{2}h(a+b)$$

ORDER OF OPERATIONS

Mathematicians have agreed on an **order of operations** for simplifying expressions.

Original expression: $(10-3\cdot 2)\cdot 2^2 - \frac{13-3^2}{2} + 6$

Circle expressions that are grouped within parentheses or by a fraction bar: $(10-3\cdot 2)\cdot 2^2 - \frac{13-3^2}{2} + 6$

Simplify *within* circled expressions using the order of operations: $(10-3\cdot 2)\cdot 2^2 - \frac{13-3\cdot 3}{2} + 6$

- Evaluate exponents.
- Multiply and divide from left to right. $(10-6)\cdot 2^2 - \frac{13-9}{2} + 6$
- Combine terms by adding and subtracting from left to right. $(4)\cdot 2^2 - \frac{4}{2} + 6$

Circle the remaining terms: $(4)\cdot 2^2 - \frac{4}{2} + 6$

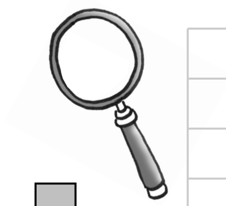
Simplify *within* circled terms using the order of operations as above:

$$4\cdot 2\cdot 2 - \frac{4}{2} + 6$$

$$16 - 2 + 6$$

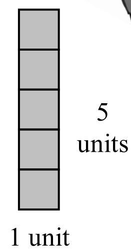
$$20$$

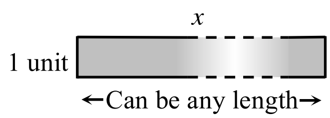
NAMING ALGEBRA TILES



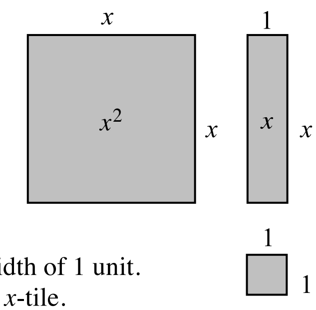
Notes:

Algebra tiles help us represent unknown quantities in a concrete way. For example, in contrast to a 1×5 tile that has a length of 5 units, like the one shown at right, an *x*-tile has an unknown length. You can represent its length with a symbol or letter (like *x*) that represents a number, called a variable. Because its length is not fixed, the *x*-tile could be 6 units, 5 units, 0.37 units, or any other number of units long.





Algebra tiles can be used to build algebraic expressions. The three main algebra tiles are shown at right. The large square has a side of length x units. Its area is x^2 square units, so it is referred to as an x^2-tile.



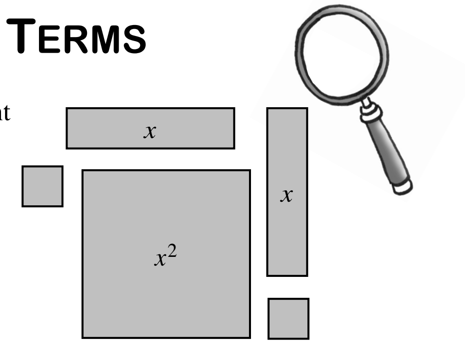
The rectangle has length of x units and width of 1 unit. Its area is x square units, so it is called an *x*-tile.

The small square has a side of length 1 unit. Its area is 1 square unit, so it is called a one or unit tile. Note that the unit tile in this course will not be labeled with its area.

Notes:

Combining Like Terms

This course uses tiles to represent variables and single numbers (called **constant terms**). Combining tiles that have the same area to write a simpler expression is called **combining like terms**. See the example shown at right.



$x^2 + 2x + 2$

More formally, **like terms** are two or more terms that have the same variable(s), with the corresponding variable(s) raised to the same power.

Examples of like terms: $2x^2$ and $-5x^2$, $4ab$ and $3ab$.

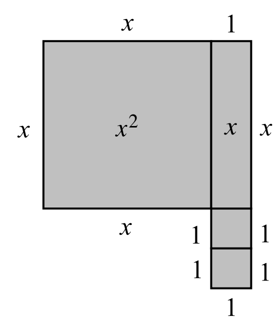
Examples that are *not* like terms: 5 and $3x$, $5x$ and $7x^2$, a^2b and ab.

When you are not working with the actual tiles, it helps to visualize them in your mind. You can use the mental images to combine terms that are the same. Here are two examples:

Example 1: $2x^2 + x + 3 + x^2 + 5x + 2$ is equivalent to $3x^2 + 6x + 5$

Example 2: $3x^2 + 2x + 7 - 2x^2 - x + 7$ is equivalent to $x^2 + x + 14$

When several tiles are put together to form a more complicated figure, the area of the new figure is the sum of the areas of the individual pieces, and the perimeter is the sum of the lengths around the outside. Area and perimeter expressions can be **simplified**, or rewritten, by combining like terms.



For the figure at right, the perimeter is:
$x + 1 + x + 1 + 1 + 1 + 1 + 1 + x + x = 4x + 6$ units