Oak Park Elementary School District 97

MATH NEWS

Grade 5 | Module 5 | Topic C | Area of Rectangles w/ Fractional Sides

Welcome

This document is created to give parents and students a better understanding of the math concepts found in the Eureka Math (© 2013 Common Core, Inc.) that is also posted in the Engage New York material taught in the classroom. Grade 5 Module 5 of Eureka Math (Engage New York) covers Addition and Multiplication with Volume and Area. This newsletter will discuss finding the area of rectangles with fractional side lengths.

Objectives

- Find the are of rectangles with whole-by-mixed and whole-by-fractional number side lengths and mixed-by-mixed and fraction-by-fraction side lengths by tiling, record by drawing, and relate to fraction multiplication.
- Measure to find the area of rectangles with fractional side lengths.
- Multiply mixed number factors and relate to the distributive property and the area model.
- Solve real word problems involving area of figures with fractional side lengths using visual models and/or equations.

Important Information

Words to Know

- area
- rectangle
- square
- tiling
- distributive property

Things to Remember

Area: The number of square units that covers a two-dimensional figure

Rectangle: A four-sided figure with four 90° angles

Square: A rectangle with four equal side lengths

Distributive Property: Breakdown one or two factors of a multiplication problem into its addends, multiply each other by the other factor, and then add the products together to get the whole answer

Examples:

54 x 2 = (50 +4) x 2
= (50 x 2) + (4 x 2)
= 100 + 8
= 108

38 x 12 = (30 + 3) x (10 + 2)
= (30 x 10) + (30 x 2) + (8 x 10) + (8 x 2)
= 300 + 60 + 80 + 16
= 456

3¾ units x 5½ units is read 3¾ units **by** 5½ units

u^2: Is read units squared

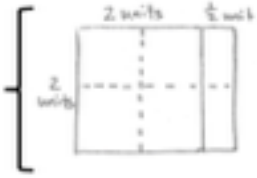
in^2: Is read inches squared

Resources

Explanation

This topic begins with students using tiling to find the area of rectangles. **Tiling** is a strategy used to find area of rectangles. Tiling is a strategy used to find the area of rectangle by covering the entire figure with square units and fractional parts of square unit.

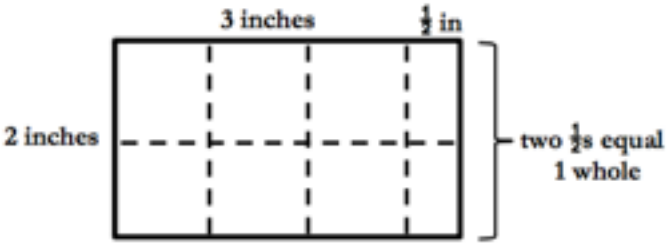
Example of tiling



Example Problem

Randy made a mosaic using different color rectangular tiles. Each tile measured 3½ inches x 2 inches. If he used six tiles, what is the area of the whole mosaic in square inches?

The drawing below resembles and area model used in earlier modules when students multiplied whole numbers and decimal fractions. Now the area model has fractional parts.
The 3½ is thought of as 3 + ½. Using **tiling**, each whole square represents 1 square inch. To represent ½ inch, the whole square is cut in half and only half is showing in the model. There are 6 whole squares and two ½s.



The area of one tile is 7 square inches. Since there are 6 tiles, the area of the whole mosaic is 42 square inches or 42 in^2 (6 x 7).

Algorithm using the distributive property:

$3\frac{1}{2} \times 2 = (3 + \frac{1}{2}) \times 2$
$= (3 \times 2) + (\frac{1}{2} \times 2)$
$= 6 + 1$
$= 7$

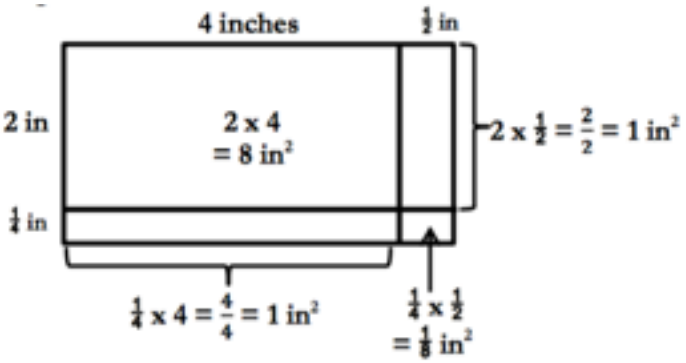
Algorithm without using the distributive property; the mixed number is changed into an improper fraction:

$$3\frac{1}{2} \times 2 = \frac{7}{2} \times 2 = \frac{7 \times 2}{2} = \frac{14}{2} = 7$$

Eventually students will just record partial products rather an draw individual tiles.

Example Problem: Francine cut a rectangle out of construction paper to compete in her art project. The rectangle measured 4½ inches x 2¼ inches. What is the area of the rectangle that Francine cut out?

(Cont.)



Add the partial products together to find the area.

$$8 \text{ in}^2 + 1 \text{ in}^2 + 1 \text{ in}^2 + \frac{1}{8} \text{ in}^2 = 10\frac{1}{8} \text{ in}^2$$

The area of the rectangle cut out is $10\frac{1}{8}$ square inches.

Algorithm using the distributive property:

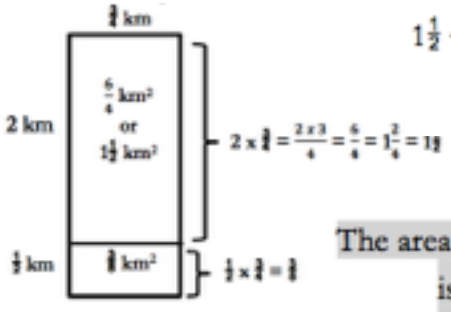
$$4\frac{1}{2} \times 2\frac{1}{4} = (4 + \frac{1}{2}) \times (2 + \frac{1}{4})$$
$$= (4 \times 2) + (4 \times \frac{1}{4}) + (\frac{1}{2} \times 2) + (\frac{1}{2} \times \frac{1}{4})$$
$$= 8 + 1 + 1 + \frac{1}{8}$$
$$= 10\frac{1}{8}$$

Algorithm without using the distributive property; mixed numbers are changed to improper fractions:

$$4\frac{1}{2} \times 2\frac{1}{4}$$
$$= \frac{9}{2} \times \frac{9}{4} = \frac{81}{8} = 10\frac{1}{8}$$

The algorithm is provided to students are exposed to a more formal representation of distribute property. However, students are not required to be as formal in their calculations. Using an area model to keep track of their thinking is sufficient.

Problem: Find the area of a rectangle that measures ¾ km x 2½ km. Draw an area model if it helps.

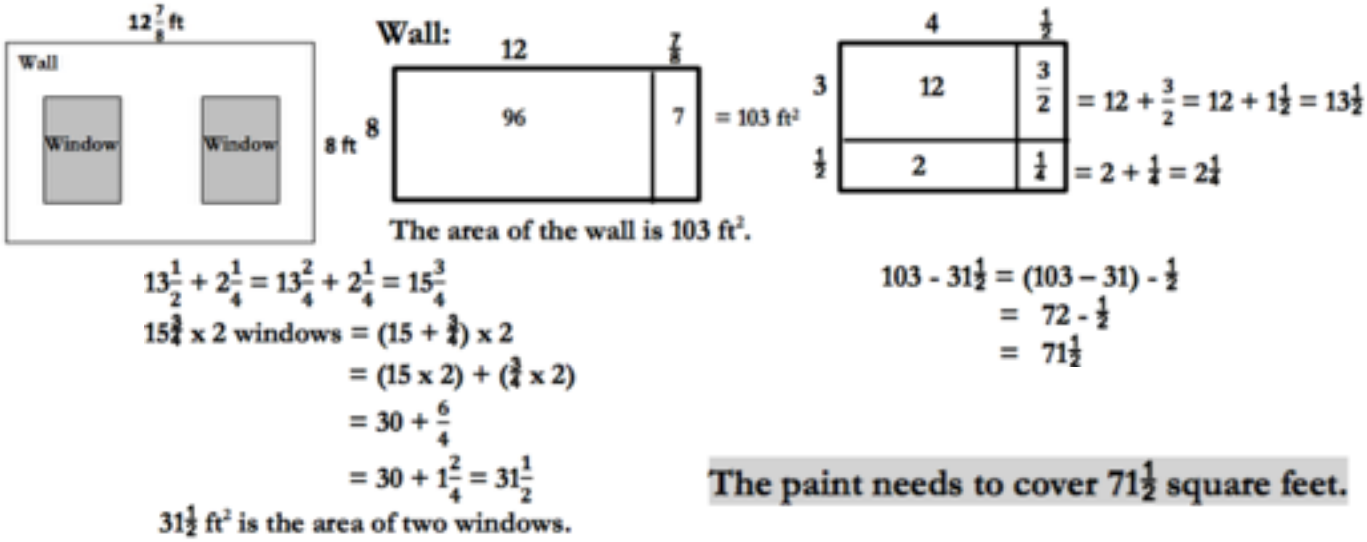


$$1\frac{1}{2} + \frac{3}{8} = 1 + \frac{4}{8} + \frac{3}{8}$$
$$= 1\frac{7}{8}$$

The area of the rectangle is $1\frac{7}{8}$ km^2.

Application Problem

John decided to paint a wall with two windows. Both windows are 3½ ft by 4½ ft rectangles. Find the area the paint needs to cover.



$13\frac{1}{2} + 2\frac{1}{4} = 13\frac{2}{4} + 2\frac{1}{4} = 15\frac{3}{4}$

$15\frac{3}{4}$ x 2 windows $= (15 + \frac{3}{4}) \times 2$

$= (15 \times 2) + (\frac{3}{4} \times 2)$

$= 30 + \frac{6}{4}$

$= 30 + 1\frac{2}{4} = 31\frac{1}{2}$

$31\frac{1}{2}$ ft² is the area of two windows.

$103 - 31\frac{1}{2} = (103 - 31) - \frac{1}{2}$

$= 72 - \frac{1}{2}$

$= 71\frac{1}{2}$

The paint needs to cover $71\frac{1}{2}$ square feet.

District Mathematics Website

Be sure to visit our District 97 5th Grade Math Resources Website. It has a ton of resources that can further assist your 5th Grade Family! Some of the specific elements are detailed below.

Website: http://op97mathgrade5.weebly.com/module-5.html

Homework Helper

Would you like written homework help specific for each lesson in this Topic? Click below to access it!

Website: http://op97mathgrade5.weebly.com/uploads/2/2/9/1/22918938/homework_helper-grade_5_module_5.pdf

Video Help

Flipped learning is a great way to review topics that your student is learning in the classroom. The following are links to videos that give detailed explanations for each lesson in this topic.

Website: https://www.tes.com/lessons/wQKlG_SZQLbceA/video-help-module-5

Module 5 Parent Tips

Eureka Math has created a guide to this Module specifically for parents. Click below to access it!

Website: http://op97mathgrade5.weebly.com/uploads/2/2/9/1/22918938/eureka_math_module_5_parent_tip_sheet.pdf