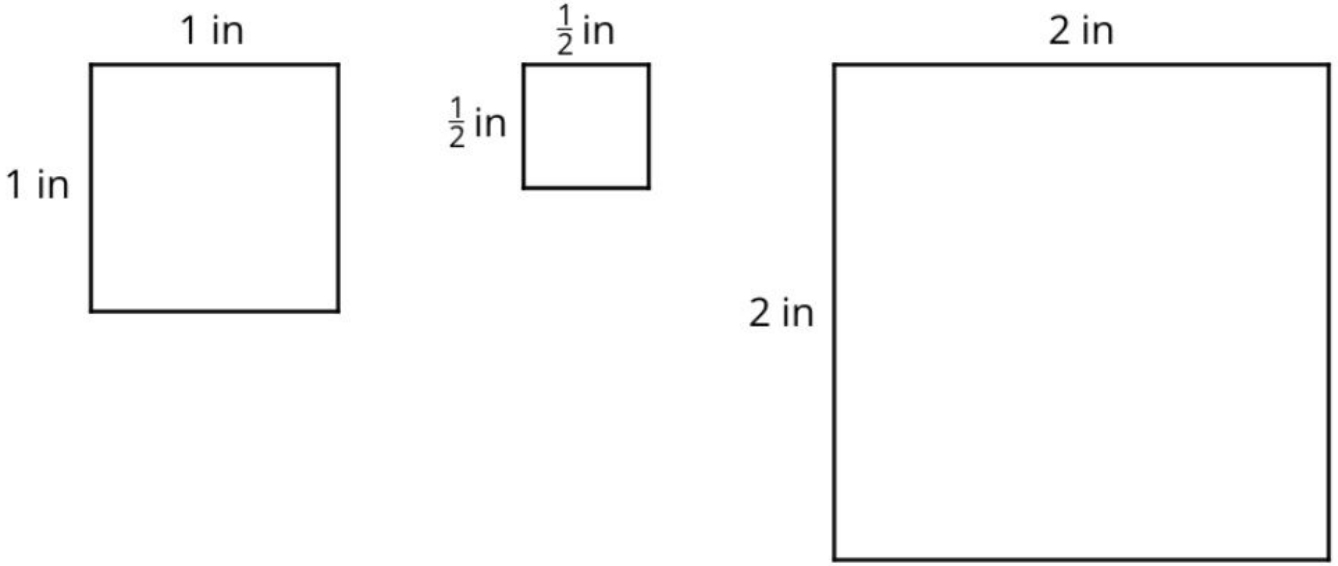
4-13: Learning Goals

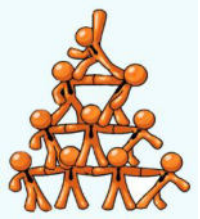
- Let’s explore rectangles that have fractional measurements.

4-13-1: Areas of Squares



1. What do you notice about the areas of the squares? Write your observations.

2. Consider the statement: "A square with side lengths of $\frac{1}{3}$ inch has an area of $\frac{1}{3}$ square inches." Do you agree or disagree with the statement? Explain or show your reasoning.



4-13-2: Areas of Squares and Rectangles

Use one piece of $\frac{1}{4}$-inch graph paper for the following.

1. Use a ruler to draw a square with side length of 1 inch on the graph paper. Inside the square, draw a square with side length of $\frac{1}{4}$ inch.

   a. How many squares with side length of $\frac{1}{4}$ inch can fit in a square with side length of 1 inch?

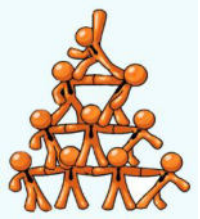
   b. What is the area of a square with side length of $\frac{1}{4}$ inch? Explain or show how you know.

2. Use a ruler to draw a rectangle that is $3\frac{1}{2}$ inches by $2\frac{1}{4}$ inches on the graph paper. Write a division expression for each question and answer the question.

   a. How many $\frac{1}{4}$-inch segments are in a length of $3\frac{1}{2}$ inches?

   b. How many $\frac{1}{4}$-inch segments are in a length of $2\frac{1}{4}$ inches?

3. Use your drawings to show that a rectangle that is $3\frac{1}{2}$ inches by $2\frac{1}{4}$ inches has an area of $7\frac{7}{8}$ square inches.

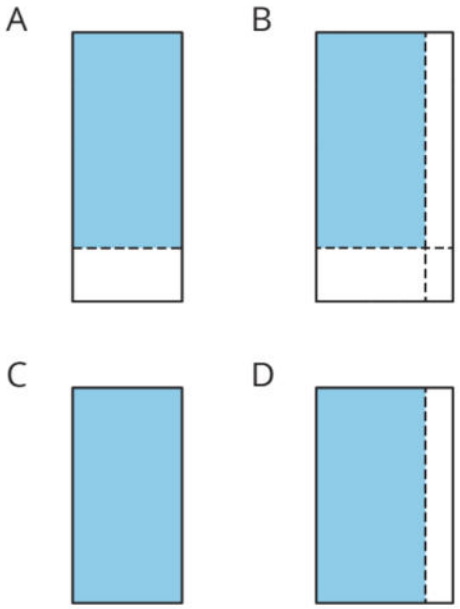


4-13-3: Areas of Rectangles

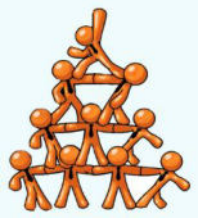
Each of the following multiplication expressions represents the area of a rectangle.

$2 \cdot 4$ $\quad 2\frac{1}{2} \cdot 4$ $\quad 2 \cdot 4\frac{3}{4}$ $\quad 2\frac{1}{2} \cdot 4\frac{3}{4}$

1. All regions shaded in light blue have the same area. Match each diagram to the expression that you think represents its area. Be prepared to explain your reasoning.



2. Use the diagram that matches $2\frac{1}{2} \cdot 4\frac{3}{4}$ to show that the value of $2\frac{1}{2} \cdot 4\frac{3}{4}$ is $11\frac{7}{8}$.



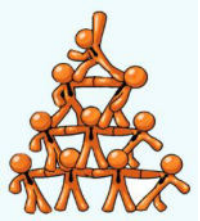
4-13-4: How Many Would It Take? (Part 2)

Noah would like to cover a rectangular tray with rectangular tiles. The tray has a width of $11\frac{1}{4}$ inches and an area of $50\frac{5}{8}$ square inches.

1. Find the length of the tray in inches.

2. If the tiles are $\frac{3}{4}$ inch by $\frac{9}{16}$ inch, how many would Noah need to cover the tray completely, without gaps or overlaps? Explain or show your reasoning.

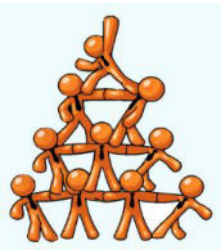
3. Draw a diagram to show how Noah could lay the tiles. Your diagram should show how many tiles would be needed to cover the length and width of the tray, but does not need to show every tile.



4-13: Lesson Synthesis

"What are some ways that we can find the area of a rectangle that is $5\frac{1}{2}$ cm by $3\frac{1}{2}$ cm?"

"Suppose we know that the width of a rectangle is $4\frac{3}{5}$ cm and the area is $16\frac{1}{10}$ sq cm. How can we find its length?"



4-13: Learning Targets

- I can use division and multiplication to solve problems involving areas of rectangles with fractional side lengths.

4-13-5: Two Frames

Two rectangular picture frames have the same area of 45 square inches but have different side lengths. Frame A has a length of $6\frac{3}{4}$ inches, and Frame B has a length of $7\frac{1}{2}$ inches.

1. Without calculating, predict which frame has the shorter width. Explain your reasoning.

2. Find the width that you predicted to be shorter. Show your reasoning.